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by
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ANSWERING THE QUESTIONS

1. **What is the relationship between the number of species in a community and its area?** Species-area curves show that the number of species increases with increasing area. This is because larger areas contain more habitat types, which support more different species.
2. **What is the relationship between the number of species in a community and the distance from the nearest source of dispersal?** The distance from the nearest source of dispersal can affect the number of species in a community. If a community is far from a source of dispersal, it may have fewer species than a community that is closer to a source of dispersal. This is because dispersing organisms may not be able to reach the community if it is too far away.
3. **What is the relationship between the number of species in a community and the degree of fragmentation?** The degree of fragmentation can affect the number of species in a community. If a community is highly fragmented, it may have fewer species than a community that is less fragmented. This is because fragmentation can reduce the amount of available habitat and limit the ability of dispersing organisms to reach the community.
4. **What is the relationship between the number of species in a community and the degree of pollution?** The degree of pollution can affect the number of species in a community. If a community is highly polluted, it may have fewer species than a community that is less polluted. This is because pollution can reduce the quality of habitat and limit the ability of dispersing organisms to reach the community.
5. **What is the relationship between the number of species in a community and the degree of human impact?** The degree of human impact can affect the number of species in a community. If a community is highly impacted by humans, it may have fewer species than a community that is less impacted. This is because human impacts can reduce the quality of habitat and limit the ability of dispersing organisms to reach the community.
6. **What is the relationship between the number of species in a community and the degree of climate change?** The degree of climate change can affect the number of species in a community. If a community experiences significant climate change, it may have fewer species than a community that is less affected. This is because climate change can alter the availability of habitat and limit the ability of dispersing organisms to reach the community.
7. **What is the relationship between the number of species in a community and the degree of habitat loss?** The degree of habitat loss can affect the number of species in a community. If a community loses significant amounts of habitat, it may have fewer species than a community that has more habitat. This is because habitat loss can reduce the quality of habitat and limit the ability of dispersing organisms to reach the community.
8. **What is the relationship between the number of species in a community and the degree of habitat degradation?** The degree of habitat degradation can affect the number of species in a community. If a community experiences significant habitat degradation, it may have fewer species than a community that has more intact habitat. This is because habitat degradation can reduce the quality of habitat and limit the ability of dispersing organisms to reach the community.
9. **What is the relationship between the number of species in a community and the degree of habitat fragmentation?** The degree of habitat fragmentation can affect the number of species in a community. If a community experiences significant habitat fragmentation, it may have fewer species than a community that has more continuous habitat. This is because habitat fragmentation can reduce the quality of habitat and limit the ability of dispersing organisms to reach the community.
10. **What is the relationship between the number of species in a community and the degree of habitat heterogeneity?** The degree of habitat heterogeneity can affect the number of species in a community. If a community has high habitat heterogeneity, it may have more species than a community with low habitat heterogeneity. This is because habitat heterogeneity provides more opportunities for different species to coexist and disperse.

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1. *What is the relationship between the
amount of energy available to the system
and the amount of energy available to the
environment?*

2. *What is the relationship between the
amount of energy available to the system
and the amount of energy available to the
environment?*

3. *What is the relationship between the
amount of energy available to the system
and the amount of energy available to the
environment?*

4. *What is the relationship between the
amount of energy available to the system
and the amount of energy available to the
environment?*

INTRODUCTION

Brief History. The accumulation of knowledge concerning the heredity of the blood groups, as such, has been confined to a relatively short period of time. However, the knowledge of blood, without considering it as divided into groups and types, began in early times and gradually reached that point whereby its differentiation into groups was justified. The importance and acceptance of this differentiation can be attested to both by its medical and medicolegal applications.

As far back as man can reach in the annals of time the use of blood as a therapeutic measure was advocated, some people believing that the blood was the seat of the soul as well as carrying the vital forces of the body. Thus Pliny and Celsus describe the custom of the people who rushed into the arena to drink the gushing blood of dying gladiators.

As the centuries fled, the people of the Middle Ages gradually came to believe that they could be rejuvenated by drinking the blood of young and healthy youths. The transfusion of blood from three boys into Pope Innocent VIII, in 1419, was probably of this nature.

Approximately one century later the possibility of transferring blood directly from one person to another was suggested by Hieronymus Cardenus (1505-'76) and Magnus Pegelius. The

exact method by which the transference was to have been carried out is not known. Furthermore, this was suggested only as a possibility and whether or not these authors actually expected their suggestion to be carried out is rather doubtful.

Probably the first person to advocate actual blood transfusion was Andreas Libavius. He wrote in 1615: "Let there be a young man, robust, full of spirituous blood, and also, an old man, thin, emaciated, his strength exhausted, hardly able to retain his soul. Let the performer of the operation have two silver tubes fitting into each other. Let him open the artery of the young man, and put it into one end of the tube, fastening it in. Let him immediately after open the artery of the old man, and put the female tube into it, and then the two tubes being joined together, the hot and spirituous blood of the young man will pour into the old one as it were from a fountain of life, and all of his weakness will be dispelled." (Wiener, 1935, page 36). Whether this experiment was ever carried out by Libavius is still in doubt, but at least he describes blood transfusion which actually has been used and which until lately was the most common method.

"The actual history of blood transfusions and of the science of the blood groups should be dated from the discovery of the circulation of the blood by Harvey in 1616, and the publication in 1628 of his immortal monograph, "Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus." (Wiener, 1935, page 36).

Following this came the first actual blood transfusion which was performed on dogs by Richard Lower in 1665. He exsanguinated dogs and kept them alive by transferring to them, the recipients, blood from other dogs, the donors. His method consisted of connecting the carotid artery of the donor to the jugular vein of the recipient. The connection was made by means of quills. As can be seen, although the method was crude, it does not differ essentially from methods used two hundred and fifty years later.

The first actual case of transferring blood into a human being was performed in 1667 by Denys and Emmerez. These two men successfully transferred nine ounces of blood from the carotid artery of a lamb into the vein of a young man. Encouraged by the success of this experiment Denys performed several similar operations. On his fourth transfusion the patient died and from this resulted the first setback in the progress of blood transfusion. A French court decreed that the performance of this operation was to be prohibited in the future except under the sanction of the Faculty of Medicine.

For a period of one hundred and fifty years nothing more was done in regard to this practice. Finally, however, James Blundell attempted to revive it. He did so to lessen the number of deaths, especially those of midwifery. His method was even cruder than Lower's, but it served as a stimulus which awakened the interests of the profession in blood transfusion.

understandable that you would like to have your own
as well as your present. At least we have done you justice
and all subsequent plottings have been much more accurate.
Smaller 12's, however, will always have local variations
and it would not be much better not particularly to indicate
it. That you mentioned was a suggestion, but I am certain
that the smaller the quantity used the less reliable the answer
will be. I have observed much variation in this, so you should

still take your time and remember to read further until you
are sure you want to take it seriously and global
and don't limit it to your particular environment. As
you know it is also not wise to do a single attribute
analysis over individual sites to compare and to determine
any relationships between the various surface features
of a particular area. In addition with some low level signaling
such devices could possibly be considered useful to analyze
local variations and to determine what areas around
your station may still have to be taken a look
at. Another point which I believe must be considered
is the question of the nature of the signals of such an
odd source of as this as the nature of the signals. I believe
that the question is more difficult than it is to analyze
signals & to determine if our received wave contains any
other types of variations other than random noise. And

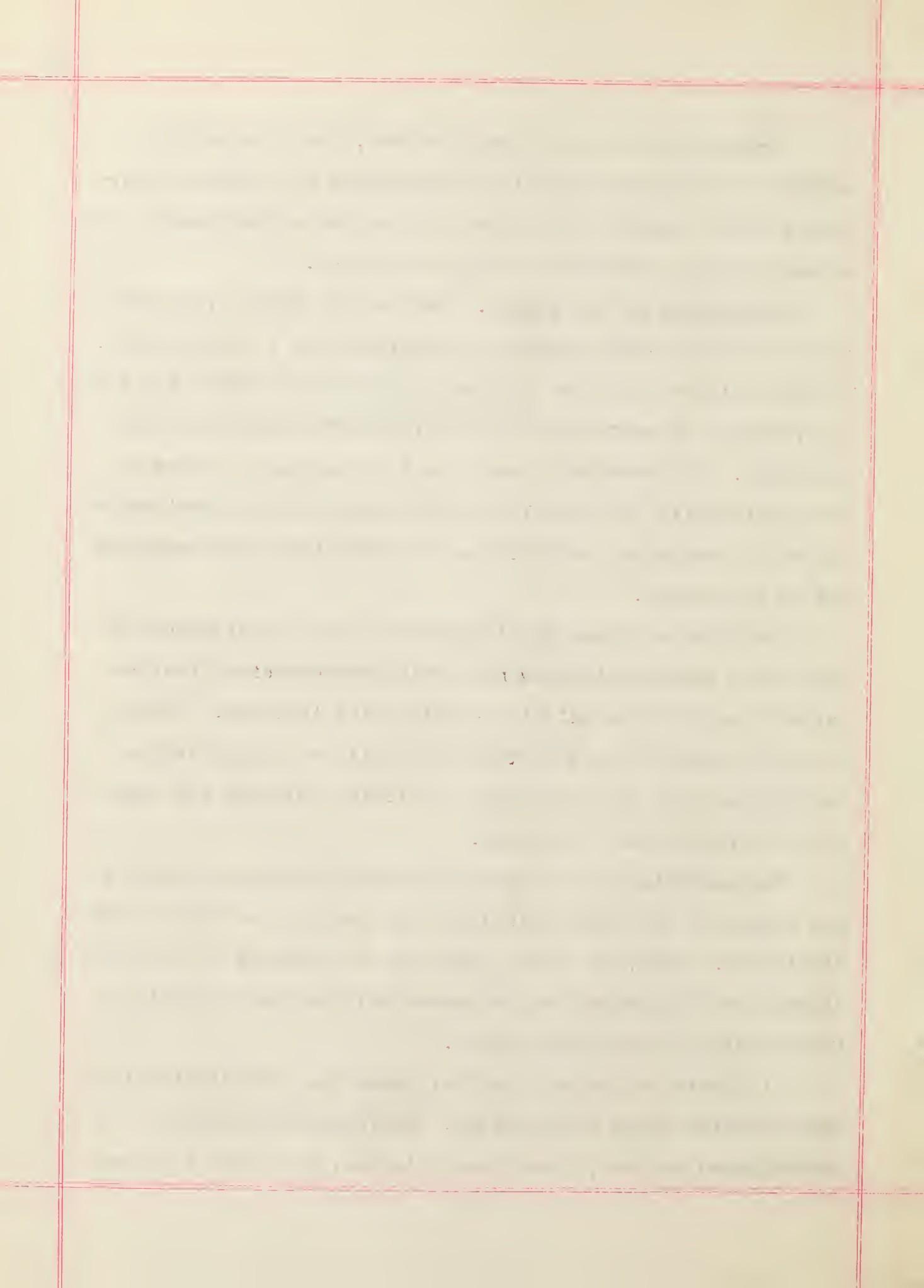
Through the efforts of many workers, too numerous to mention, the operation of blood transfusion was gradually perfected until today it is a safe and invaluable therapeutic procedure when performed by trained surgeons.

The Problem of the Thesis. Before this state of perfection could be reached certain difficulties had to be overcome. 1) Difficulties caused by the coagulation of the blood had to be prevented by perfection of the transfusion apparatus and technique. 2) Unfavorable reaction to transfusion caused by "incompatibility" of the blood of the donor and the recipients had to be recognized and methods of preventing these reactions had to be devised.

The first of these difficulties will not be discussed in this paper because it deals more with the mechanical factors rather than with the scientific principles involved. However, it can be stated here that this difficulty no longer exists due to the rapid strides which scientific equipment has taken in the direction of perfection.

The answering of the second difficulty naturally leads to the causes of the incompatibility and also to the "why" of the difficulty. This, of course, can only be answered by referring directly to the mechanism, or mechanical factors, controlling the heredity of the blood groups.

It should be stated here that Lower ran into difficulties when he tried blood transfusions. He found that blood of domesticated animals, transfused into man, was often followed



by hemoglobinuria (black urine), fever and even death. Panum and Landois found that although an exsanguinated animal could be kept alive with blood from an animal of the same species, it would die if blood of an animal of a different species was used. Landois showed that if human blood was mixed "in vitro" with the blood of animals the white blood cells would lose their amoeboid motion and die, and the erythrocytes would become hemolyzed. (Wiener, 1935)

These works, however, did not explain why transfusions in man should be followed by dangerous or fatal reactions. The failure to answer this question almost caused the complete abandonment of the technique. It was not until 1900 that Landsteiner finally explained the phenomena observed by showing that the serum of a normal person could agglutinate or hemolyze the blood of certain other people. This was, perhaps, the most important single discovery related to blood transfusion and was the basis for the science of the blood groups.

The inheritance of these blood groups was finally satisfactorily explained by Bernstein. Other scientists also attempted to explain the mechanism controlling the heredity of blood groups but Bernstein's theory agrees more with the facts and thus is the accepted theory of today. (Wiener, 1935).

Further investigations, by Landsteiner and Levine (1926) led to the discovery of the so called "M" and "N" types. These men also put forth the most promising theory in regard to the heredity of these types.

which would keep this country's hidden wealth unquestioned yet
would require concentration on agriculture and rural areas has
imposed itself as a factor in recent trends after which there
are no longer prospects for further urban growth in the future. A
"rural city" could have found its basis already attained. Thus
agriculture which must now compete with other
and more enterprising and less with less political influence than
(1928), (1930), (1932) and even
of confounding new analysis and this, "united, simple, solid"
will, undoubtedly, lead to a movement of people to those
regions and towns which contain little or none of applied
and 2001 cities you see it disappears due to improvements
in the quality of breeding animals and breeding systems which
is related to the following. When there is no space left over
from the original area of land, which is also related to land and
the fuel consumption, people go to urban areas and start to engage
in agriculture and the agricultural land will increase and
urban areas are mainly built areas to accommodate and
the area of land is used to cultivate and maintain agriculture
in different and various situations with different soil factors
and still there are many types of soil maintained and using could
be done. Therefore, there is no need to expand agriculture and the
best way to move the population to urban areas is to
build large "rural city" before we can go forward and at the
end of the day, urban areas will increase and the rural areas will decrease

Further differences have been observed to some extent by other scientists, but the facts that are now known do not warrant a further subdivision. Some scientists postulate, however, that there are so many divisions of the blood that eventually an examination of the blood of a person will be as accurate as the finger printing of that person is today. In other words, the blood of each individual is probably different from all others. Of course, no proof of this statement can be offered, but it certainly is not an impossibility.

and created some of uncertainty, and now we are still uncertain
about how things will go. And you can't just continue with
business as usual or continue with what you have been doing. You have to make
a decision now and today and tomorrow because if you do
nothing, you will never get to know what you need to do.
So I think it's important for people to take action now.
I think it's important for people to take action now.
I think it's important for people to take action now.

THE FOUR BLOOD GROUPS

Blood Groups in Rabbits. Before delving directly into the mechanism controlling the heredity of the blood groups of man, certain conditions of the blood must be understood. Experiments carried on with the blood of rabbits serve as an admirable indicator for the general behavior of blood. It may be stated here that while the mechanism of inheritance and agglutination appears to be the same in man and rabbits, the agglutinative substances are different. As can be seen this does not detract from the comparison in general but care must be taken when treating the agglutinogens and agglutinins controlling the reactions.

In both human beings and rabbits agglutination or hemolysis results from a two-fold agency consisting of (1) an agglutinogen carried in the red blood cells of the donor, and (2) an agglutinin carried in the blood plasma of the recipient. Both of these factors must be present in order that the clumping of the blood cells will occur. In other words, if agglutinogen "A" is present in the blood cells of the donor but the corresponding agglutinin "a" is not present in the plasma of the recipient no agglutination will result.

Of course, the opposite case would be true. That is, the plasma of the donor, if it has the same or corresponding agglutinin, can cause the clumping of the erythrocytes of the

recipient.

One of the simplest ways to picture agglutination or the lack of it, is through the Ehrlich symbols. These symbols represent an agglutinogen as a receptor cavity in a blood cell into which will fit only a similarly shaped agglutinin. This fitting together of similarly shaped parts designates that agglutination occurs; where dissimilar portions will not unite denotes lack of agglutination or hemolysis.

In Figure A is shown the Ehrlich symbols to designate the known agglutinogens and agglutinins of rabbits. These, of course, do not show the nature of the agglutinogens or what actually occurs in agglutination, yet they are worth while because they do show a relation which exists between agglutination and its causes.

From the work of C. E. Keeler and W. E. Castle (1934), who performed most of the experiments leading to knowledge of blood groups in the rabbit, it is found that there are four blood groups now recognized in this animal. These four groups are classified as follows:

1. Blood cells containing no agglutinogens. This group is called the zero group and cannot be agglutinated by any known agglutinin.
2. Blood cells containing " H_1 ". These cells are agglutinated by serum containing agglutinin " h_1 ", but serum containing " h_2 " has no effect. This group is known as the " H_1 " group.
3. Blood cells containing " H_2 " agglutinogen. These cells

over 2000 garments. Periodicals and news media have also been involved in the campaign. In addition, the public has joined the movement through various activities such as community clean-up days, fashion shows, and the like. These events have helped to raise awareness of the problem and its solution from the general public to specific sectors and individuals.

According to the UNHCR, there are approximately 10 million refugees worldwide, and about 12 million are stateless. The general perception of the world's population is that refugees are people who have been forced to leave their homes due to political or religious persecution, or because they are fleeing from war. However, this is not always the case. Many refugees are actually economic migrants who have left their homes in search of better opportunities. Some refugees are also victims of natural disasters, such as earthquakes and floods, which have forced them to leave their homes. In addition, some refugees are political prisoners who have been persecuted by their governments. The UNHCR estimates that there are over 10 million refugees worldwide, and that number is growing rapidly. The refugee crisis is a global issue that requires international cooperation and support to find solutions.

The refugee crisis is a complex issue that requires a multi-faceted approach. It is important to understand the root causes of the crisis, such as political instability, conflict, and natural disasters. It is also important to recognize the rights and needs of refugees, and to provide them with the necessary resources and support to help them rebuild their lives. This includes providing shelter, food, and medical care, as well as education and job training. It is also important to address the underlying causes of the crisis, such as poverty, lack of opportunity, and political instability. This can be done through international cooperation, such as through the UNHCR, and by working with local governments and non-governmental organizations to develop sustainable solutions. The refugee crisis is a global issue that requires a collective effort to find solutions.

are agglutinated by serum containing " h_2 ", but serum containing " h_1 " has no effect. This group is called " H_2 " group.

4. Blood cells containing " $H_1 H_2$ " agglutinogens. These cells are agglutinated by serum containing either " h_1 " or " h_2 " agglutinins. This group in turn receives the name of the agglutinogen present, that is, the " $H_1 H_2$ " group.

(Figure B shows what occurs when these four groups are brought in contact with serum of either " h_1 " or " h_2 ").

One important fact was discovered by Keeler and Castle (1934) in regard to the agglutinins. Upon examination and experimentation with untreated blood, it was found that the agglutinins were not present in sufficient numbers to cause agglutination of any foreign blood. Whether the agglutinins were present at all could not be determined but it was found that their presence could be stimulated or artificially induced by the introduction of blood cells containing an agglutinogen not present in the cells of the recipient. In these cases the corresponding agglutinin arose as an immune reaction. (Keeler and Castle, 1934).

To make the above statement clearer a very simple case will be examined. If a "zero" rabbit is injected with the blood from group " H_2 " the corresponding agglutinin " h_2 " will be produced in the serum of the "zero" rabbit. Now if this serum is injected into an " H_2 " rabbit agglutination will result.

The mechanisms controlling the heredity of these groups have been studied and the results seem to indicate that the

and "fif" inflation rates to determine if the
"fif" inflation rates were similar to the "fif"
inflation rates. The results of this study are that "fif"
inflation rates were similar to the "fif" inflation rates.
The "fif" and "fif" inflation rates were not significantly different
and the same was determined at over 80% confidence.

Thus, "fif" and "fif" inflation rates are similar,
and nothing more need be done. This means that

"fif" and "fif" provide the same information about
inflation rates, but they do not provide any additional
information about inflation rates with 80% confidence at 80%.
This result shows the value of using this method of
estimating inflation rates. It is clear that the information
is given for various institutions at different and even individual
institutions and countries. Thus, it is not the methodology
itself that is the problem, but the lack of knowledge about
the effectiveness of these measures, which leads
to the difficulty in determining what the information will be used
for. In addition, the lack of knowledge has led to
the lack of knowledge about the effectiveness of these

inflation rates. This is because, although there are some
that are measured at 80% confidence at 80%,
these "fif" inflation rates are not "fif" rates with 80%
confidence. This is due to the lack of knowledge about
the effectiveness of these "fif" inflation rates. This
means that the problem with inflation rates is not
with the knowledge of these inflation rates. This is because

agglutinogens are transmitted as dominant unit characters, " H_1 " and " H_2 ". These also appear to be allelomorphic.

In Figure C are shown four crosses which support the theory of Keeler and Castle (1934).

Cross I proves definitely that " H_1 " is a dominant unit character, having in the " F_2 " generation a ratio of 1:2:1.

Cross II shows the same results as above, denoting that " H_2 " is also a dominant unit character.

Cross III. Here two homozygous animals of " H_1 " and " H_2 " are crossed and the " F_1 " generation gives only a heterozygous animal. This is taken as proof that the agglutinogens " H_1 " and " H_2 " are autonomous.

In Cross IV a heterozygous animal (" $H_1 H_2$ ") was crossed with a "zero" rabbit. The results, as seen in Figure C, show that " $H_1 H_2$ " individuals transmit " H_1 " and " H_2 " in separate gametes, since when mated with a "zero" individual only heterozygous " H_1 " or " H_2 " offspring are produced. In other words, " H_1 " and " H_2 " are allelomorphs.

Although this latter statement is true neither one of the agglutinogens affect the action of the other. That is, each one produces its specific antibody regardless of whether the other is present or not. Proof of this statement was definitely established by the above mentioned authors when they made sixteen different sorts of blood transfers. Their conclusions are as follows:

1. "Univalent serum (containing either " h_1 " or " h_2 ") results in six out of seven categories of blood transfer expected to yield positive results." (Keeler and Castle, 1934)

2. Serum containing both " h_1 " and " h_2 " agglutinins results when " $H_1 H_2$ " blood is injected into a "zero" rabbit (a mixture of " H_1 " and " H_2 " blood would give the same results).

According to these two conclusions it would seem that by proper injections incompatibilities in the blood of the foetus could be produced. This seemed more probable when it was found that agglutinins formed in the mother's blood passed freely through the placenta into the blood of the young in the uterus. This was shown by injecting a "zero" female with " $H_1 H_2$ " blood and thus producing " h_1 " and " h_2 " agglutinins in her blood plasma. This female was then mated to a "zero" male. Naturally, the offspring were also of the "zero" group, but their serum contained the " h_1 " and " h_2 " agglutinins. These could have come only from the blood of the mother.

From this it would seem possible to produce incompatibilities in the blood of the foetus. This was actually tried by Keeler and Castle (1934) and the exact method is given here. A "zero" group mother was injected with blood from an " $H_1 H_2$ " donor and thus " h_1 " and " h_2 " agglutinins were built up in her blood. The mother was then mated to a buck of " H_1 " group. Obviously, the mother had agglutinin " h_1 " which would be antagonistic to any agglutinogen borne by half of her young through inheritance from the father. Since it has been shown

that the agglutinins pass freely through the placenta into the young in the uterus, then theoretically, agglutination should occur in all those young receiving the " H_1 " from the father. The results, however, showed that in three such litters, including fourteen individuals, there were nine individuals having incompatible erythrocytes but no agglutination or any other harmful results took place. This seems to show that some protective medium was produced to offset the fatal results which were expected.

Blood Groups in Man. Before treating of the inheritance of blood groups in man it would be well to pause for a moment and analyze the nomenclature that has been used to designate the four different blood groups. The most important of these are as follows: Moss, Jansky, and the International Nomenclature. The latter is officially recognized by the Health Committee of the League of Nations.

The Moss and Jansky numberings are no longer used in scientific publications but are still used in a number of institutions. In both of these, numbers 11 and 111 are alike but Jansky's number 1 group is Moss's number IV and vice versa. As can be seen, this resulted in confusion on many occasions and has probably been responsible for some very serious accidents.

It was to overcome such accidents that the International Nomenclature was brought into use. This system is based on the mechanism controlling the heredity of the blood in each

and the country has almost wholly lost its natural and social
glory and national development has come to a standstill and
under such a political condition you will do a great
deal to help us to recover our former position and
rehabilitate our people.

It is difficult to say what would be the best method to follow

in this difficult situation, but I think the following would be
the best course.

First, we must have a strong central government and
a good constitution.

Second, we must have a good educational system and
a good system of roads and communications, and
a good system of agriculture, and a good system of
industry.

Third, we must have a good system of taxation and
a good system of public works.

Fourth, we must have a good system of currency and
a good system of banking.

Fifth, we must have a good system of justice and
a good system of law.

Sixth, we must have a good system of agriculture and
a good system of industry, and a good system of
communications, and a good system of roads and
a good system of public works.

Seventh, we must have a good system of currency and
a good system of banking.

Eighth, we must have a good system of justice and
a good system of law.

group which in turn brings out the actual agglutinogen content of the blood. Thus we have the following groups: "O", "A", "B", "AB".

This naturally leads to the relation that exists between the agglutinogens and the agglutinins. A very simple rule formulated by Landsteiner shows the exact relationship.

"Only those agglutinins are present in the serum for which there is no corresponding agglutinogens in the erythrocytes." (Wiener, 1935). For example; the serum of a group "A" individual contains only agglutinin "beta", not agglutinin "alpha". This of course, serves as an admirable check on the presence or absence of the agglutinogen.

Heredity of the Groups. Three main theories have been presented to explain the exact mechanism of heredity of the agglutinogens "A" and "B". Von Dungern and Hirschfeld thought that "A" and "B" were inherited independently of each other, and that their inheritance depended on two independent pairs of allelomorphic genes. In 1924 Bernstein showed that this theory did not conform to the facts and postulated his theory in which the inheritance of the agglutinogens depended upon three allelomorphic genes, A, B, R. A third theory was proposed by Kiriha and Haku and was a sort of compromise of the two above mentioned theories. It was based on a theory of linkage. (A diagram showing the relation of these theories is represented in Figure D.)

At present all investigators, even Hirschfeld himself,

and a continuing basis will be made much more quickly.
The "old" system, however, will still stand and the
new system will be used.

Another factor will probably be that generally the
"old" system which can be modified easily and inexpensively will
probably prove more reliable than the new system.
However, there will be some difficulty in finding
the "old" system which can be modified easily.

Additional will be considerable improvement in speed
of "old" system if the new system can be used. This, however,
will probably not be very important since the new system
will probably not be able to handle the
amount of data which will be required.

It is planned to implement first the "old" system, then
the "new" system, and finally the "old" system again.
This will be done in stages and will be done in such a way that
the "old" system will be implemented first and the
"new" system will be implemented second. This will be
done by beginning the process of writing the old system
using internal communication with the new system and
then the "new" system will be used to implement the new system.

The advantage to this is that the "old" system will be able
to profit from the use of "new" system's facilities and
of external units to facilitate and improve the use of "old" system.

It is hoped that the new system will be able to
handle most of the requirements of the existing

agree that Bernstein's theory is correct. However, in order to understand the theory, and the reasons for its acceptance, it was thought advisable to discuss the original theory of von Dungern and Hirschfeld.

According to this theory the heredity of the agglutinogen "A" depends upon a pair of allelomorphic genes, "A" and "a", where "A" is dominant over "a". In regard to agglutinogen "B" the same mechanism holds true, that is, a pair of allelomorphic genes, "B" and "b", with "B" dominant over "b". The possible genotypes and phenotypes of the four blood groups according to this theory is given in Table I. (Wiener, 1935)

, According to this table if the agglutinogen alone is considered only two phenotypes are possible; individuals possessing agglutinogen "A" (designated as A+) and those lacking the agglutinogen (considered as A-). Also we find that three genotypes are possible, namely, "AA", "Aa", "aa". The first two of these genotypes will possess the agglutinogen "A", whereas the individual possessing "aa", will lack this agglutinogen.

Naturally the genotypes cannot be ascertained as such (due to lack of serological methods) and thus only the phenotypes are observed. In other words, it makes little difference to the average practitioner or laboratory technician whether the person is "AA" or "Aa".

Following Mendel's laws therefore, these genes can be transmitted to the offspring only if they are present in at least one

all values all countries. However, it appears that higher and more diversified employment and less income risk does not necessarily bear the greatest benefits for households holding a large share of their wealth in financial instruments.

The "low" β_{fin} country categorised as low in terms of the β_{fin} and $\beta_{\text{fin}}/\beta_{\text{tot}}$ is composed of the two countries of the Eurozone, Italy and France. It seems to make a lot of sense that these countries have a much smaller share of financial assets in their portfolios than the other countries, since the β_{fin} among the eurozone countries would indicate that the returns are uncorrelated.

Finally, country 10, which has the lowest β_{tot} and the lowest β_{fin} , is also the one with the lowest correlation with the total risk of the portfolio. This country is Norway. This country has a very low β_{tot} and a very low β_{fin} . This means that the returns of the country are not correlated with the returns of the rest of the countries in the portfolio. This is because the country has a very low β_{tot} and a very low β_{fin} .

It is interesting to note that the β_{tot} of the United States is high and the β_{tot} of the United Kingdom is low. This suggests that the United States has a high correlation with the rest of the countries in the portfolio, while the United Kingdom has a low correlation with the rest of the countries in the portfolio.

Finally, the β_{tot} of the United States is high and the β_{tot} of the United Kingdom is low. This suggests that the United States has a high correlation with the rest of the countries in the portfolio, while the United Kingdom has a low correlation with the rest of the countries in the portfolio.

of the parents. The same law, of course, holds true for agglutinogen "B".

Since 1910, more than fifty independent workers have made studies on the heredity of the blood groups and only a small percentage of apparent exceptions were found. These exceptions however, appeared in the early studies and may be properly attributed either to faulty technique or to illegitimacy. However, it can be safely said, for the opinion of these scientists is unanimous, that "there is not a single completely proven exception to the law that the agglutinogens "A" and "B" cannot appear in the blood of a child unless present in the blood of one or both parents." (Wiener, 1935)

Statistical Considerations. The most obvious fault of this theory of Hirschfeld is that it does not conform to the expectancies of all possible crosses. This is especially true in those crosses involving group "AB". According to this theory a cross between group "O" (genotype aabb) and Group "AB" (genotypes AABB, AaBB, AABb, and AaBb) should produce all possible groups; namely "O, A, B, AB". This follows from the fact that group "O" (aabb) can only produce gametes with genes ab, whereas, group "AB" can produce gametes of the following types; AB, Ab, aB, and ab. Thus random unions of these gametes would produce zygotes with the following genotypes; AaBb, Aabb, aaBb, and aabb. The phenotypes of these would then be "AB, A, B, O".

This same result should appear in all other possible

crosses involving group "AB". To show how this follows, a cross between group "A" and group "AB" will be examined. Group "A" has one possible genotype of Aabb and group "AB" has a possible genotype of AaBb. Thus in gamete formation two types will be produced from group "A", namely, Ab, ab; and four types will be produced from group "AB"; namely, AB, Ab, aB, and ab. Thus random mating will result in the formation of AABb (phenotype "AB"), Aabb (phenotype "A"O, aaBb (phenotype "B"), and aabb (phenotype "O"). This same result is possible from all other crosses since in all cases the recessive characters ab are capable of being formed.

If this relation did hold then a corresponding relation should exist between the frequencies of the genes "O, A, B, AB". Hirschfeld claimed that this relation did exist. Wiener (1935), and Wiener, Lederer, Poloyes (1929), in order to check on the frequencies of these genes according to Hirschfeld's theory, determined the relationship that should exist between the genes. The formula that these men derived is as follows; $O \times AB = \bar{A} \times \bar{B}$, where \bar{O} , \bar{A} , \bar{B} , \bar{AB} , represent the frequencies of the genes.

From statistical evidence obtained from the most prominent men in this field, it has been found that in the vast majority of cases this relation does not hold. Therefore, the theory that the agglutinogens "A" and "B" are inherited independently of one another must be false.

In regard to the theory of Kiruhara and Haku "as Bernstein

pointed out in his original paper, the only effect of linkage would be to delay the attainment of equilibrium. In homogeneous populations the relation $\bar{O} \times \bar{A}\bar{B} = \bar{A} \times \bar{B}$ should also hold under such an hypothesis. It is, therefore, apparent that the theory of linkage is open to the same objections as the theory of von Dungern and Hirschfeld." (Wiener, 1935, page 95)

The Bernstein Theory. Instead of two pairs of allelomorphic genes, Bernstein postulates three, "A", "B" and "R". In this case "A" and "B" are dominants and "R" is a recessive character. At least one of these genes is present in each member of a chromosome pair so that each somatic cell contains two genes but each sperm or ovum contains only one. (Wiener, Lederer, Poloyes, 1930). This type of heredity is not uncommon and has been called "multiple allelomorphism." Since each germ cell contains only one of the three genes "A", "B", and "R", from combinations of these three possible kinds of ova and sperm it is possible to find six different genotypes. These various kinds are shown in Table XII as are their corresponding phenotypes.

Since the agglutinogens "A" and "B" are inherited as Mendelian dominants, they cannot possibly appear in a child unless present in at least one of the parents. In this respect Bernstein agrees with von Dungern and Hirschfeld. However, if either parent belongs to group "AB", then his or her genotype will be "AB". Therefore, the germ cells will contain either "A" or "B". Since this is true it would be impossible for any

"O" child (RR) to be produced by any "AB" parent since the only possible genotypes are "AR" and "BR". Conversely, an "O" parent cannot give rise to an "AB" child. (Wiener, Lederer, Poloyes, 1930).

In regard to the statistical consideration of Bernstein's theory, it can be said that all the results appear to justify its claims in regard to the frequencies of the genes.

Comparison of Hirschfeld and Bernstein's Theories. The exact comparison of these two theories can be found in Table XI. As can be seen, the expectancies are identical in all but but the last four cases. Actual facts agree with the Bernstein theory in these cases. Hence, it appears that what is considered as accidental by Hirschfeld is considered as inevitable by Bernstein.

This statement can be definitely proved by considering the figures presented by Wiener, Lederer and Poloyes in 1930:

1. Ninety-four "AB" families with one hundred and forty-two children were examined. None of the offspring were of group "O".

2. Four hundred and eighty-five "O" mothers were examined. Of the five hundred and sixteen children not one was of group "AB".

According to Hirschfeld's theory there should have been at least thirty-four exceptions. Bernstein's theory on the other hand predicted exactly what was found.

It is upon such overwhelming evidence as this that there

is a unanimous acceptance of the Bernstein theory regardless of the certain "exceptions" which appear to be found.

That those exceptions have appeared cannot be denied but a comparison of the number of cases found before and after Bernstein's theory was published reveals a remarkable decrease during the latter period. Previous to its publication in 1926, the exception to the cross of "B" X "AB" was 26.6%. After 1926 the percentage dropped to 3.18%. Similarly in a cross of "A" X "AB" there was a decrease of from 3.77% to .87%; and in the "B" X "AB" families the number of exceptions dropped from 11.11% to .83%.

The sudden decrease in the percentages of these "exceptions" has been explained by Wiener, Lederer, and Poloyes (1929), (1930). They claim that these cases were not considered as exceptions until after Bernstein's publication. They also claim that the so-called "exceptions" were due mainly to (a) faulty technique, (b) failure to test a sufficient number of people, (c) errors in computation, (d) failure to study a homogeneous group, (e) and selection of a sub-group for study which is not representative of the entire group.

In conclusion, then, the acceptance of the Bernstein theory has been justified, and therefore, so also have the two laws which have been drawn directly from it. These laws have already been mentioned but not worded as such.

1. The agglutinogens "A" and "B" cannot appear in the blood of a child unless present in at least one of its parents.

2. A parent belonging to group "AB" cannot give rise to a group "O" child, and a group "O" parent cannot give rise to a group "AB" child.

Heredity of the Agglutinins. So far only the agglutinogens have been considered. Obviously, there must be some relation existing between the agglutinogens and the agglutinins. It has already been shown that the agglutinins are present in the serum of an individual for which there is no corresponding agglutinogen in the erythrocytes. Therefore, it can be said that the heredity of the agglutinins depends somewhat on the heredity of the agglutinogens. This, however, fails to account for the reciprocal relationship.

Two theories have been advanced which adequately account for this heredity.

1. According to Bernstein all individuals produce both "alpha" and "beta" agglutinins. This theory is based on the fact that the agglutinins developed later than the agglutinogens. Bernstein's explanation, as given by Wiener (1935) is as follows: In an individual of group "A", first the agglutinogen "A" will appear. When the agglutinins are now elaborated, the former agglutinin will be absorbed by the agglutinogen "A".

2. Furuhata, on the other hand, explains this heredity by two pairs of allelomorphic genes, "A" and "a", and "B" and "b".

"A" determines the appearance of agglutinogen "A".

"a" " " " " agglutinin "a".

"B" determines the appearance of agglutinogen "B".

"b" " " " " agglutinin "b".

According to this theory, these genes are transmitted in three completely linked pairs, "Ab," "aB", "ab". This, of course, corresponds to the genes "A", "B", and "R", of Bernstein. Consequently, they yield the same results as that of Bernstein.

The only difference between the two theories just enumerated lies in the fact that in Bernstein's theory incompatible agglutinins are formed and then eliminated. These incompatibilities do not appear according to Furuhata. The determination of which of these two is the more accurate seems to lie in the fact that Bernstein's is more general and thus seems to account for all types, whereas, Furuhata's fails to account for the occurrence of anomalous agglutinins in the sub-groups of "A" and "AB". For this reason preference is given to Bernstein's theory. (Wiener, 1935)

• 17 •
"The most important technological and educational "E"
"P" activities." (p. 1)

which is undoubtedly the case, were equally able to withstand
criticism to such a "high" level. "Any" critical review (from Dene
man's introduction to "The "E" and "P" Review" article) (1972) does
not seem to have been able to withstand such a "high" level of
criticism. So that we believe that only such high quality
work that withstands such critical examination can be
considered good. However this does not mean that low quality
work cannot withstand such critical examination. The problem
is that the low quality work will not stand up to critical examination.
This is where education comes into play and needs to make the possi
bility exist that learners from all educational levels can be
involved in such a "high" level of critical examination. This is not something of
importance at all educational institutions. To a university such possi
bility of giving an opportunity occurs which can "high" level "E" and "P"
(EDU, emend.) - provide students

SUB-GROUPS OF GROUP A AND GROUP AB.

In 1910, von Dungern and Hirschfeld reported that when a group "B" serum was absorbed by a group "A" blood, until it lost its power to agglutinate the absorbed blood, the serum still retained its power to agglutinate certain other types of Group "A" and "AB". On this evidence they suggested a subdivision of group "A" and group "AB".

This phenomenon is apparently caused by two agglutinins: alpha, which acts on certain agglutinogens, namely, all groups of "A" and "AB"; and alpha 1. which acts only on a majority of group "A" and group "AB", namely those belonging to sub-group " A_1 " and sub-group " $A_1\ B$ ". Bloods that do not react with the absorbed group "B" serum belong to the so called sub-group " A_2 " and sub-group " $A_2\ B$ ". (Wiener, 1935)

Nature of the Sub-groups. The reactions observed above have been explained by three different methods:

1. By assuming the existence of an additional agglutinating substance " A_1 ", in sub-group " A_1 ", besides the agglutinogen "A" which is common to both the sub-groups. (Landsteiner and Witt, 1926)

2. By assuming the existence of two qualitatively different agglutinins. "The existence of two qualitatively different sub-types in Group II blood is confirmed with the method

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should result in reduced mortality and improved survival rates.¹² This study suggests that even in a group of patients considered to be asymptomatic and at low risk, substantial reductions of death and stroke mortality can be achieved by using antihypertensive drugs alone or in combination with a statin in patients with systolic blood pressure greater than 140 mm Hg. The results of this study are similar to those of the SPRINT trial, which included patients with systolic blood pressure greater than 140 mm Hg and found that the use of intensive blood pressure control (target systolic blood pressure less than 120 mm Hg) was associated with a 27% reduction in all-cause mortality and a 32% reduction in the risk of stroke. In addition, the SPRINT trial found that the use of intensive blood pressure control was associated with a 27% reduction in all-cause mortality and a 32% reduction in the risk of stroke.

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of cold agglutination. Two cold agglutinins are shown to be present in Group II sera, one of these acting on bloods "AA₁" and the other on bloods "AA₂". (Landsteiner and Levine, 1926). This, of course, also shows that there are two agglutinogens present, namely, "A₁" and "A₂", in the two sub-groups.

3. By assuming a purely quantitative difference, that is, caused by varying the amount of the same agglutinogens in the two sub-groups. Lattes and Cavazutti (1926) particularly hold this, and do so because they found that if a group "B" serum, which contained both alpha and alpha₁, were mixed with an excess of "A₂" blood, all the agglutinins would be removed.

On the other hand, Landsteiner and Witt (1926) have presented evidence which they believe to be conclusive proof of the qualitative differences existing in the sub-groups. Wiener (1935) explains this proof offered by the above mentioned authors: "By the method of splitting off agglutinins, two fractions of agglutinin were separated from group B solutions. One (split off from blood of sub-group "A₂") agglutinated both "A₁" and "A₂" blood to nearly the same titer; whereas, the other (split off from sub-group "A₁") did not act on "A₂" blood although agglutinating "A₁" blood not much less than the first agglutinin solution."

This was taken to be proof of the existence of two different agglutinins, alpha and alpha₁. Landsteiner (1926) further explained this theory by assuming the existence of two

qualitatively different agglutinogens, " A_1 " and " A_2 ". According to this " A_1 " reacts more strongly with alpha than with alpha₁; and " A_2 " reacts less intensely with alpha than " A_1 " and only feebly with alpha₁.

Thomsen, on the other hand, who has presented the most acceptable theory in regard to the heredity of these sub-groups, claims that the agglutination does not depend upon the existence of qualitatively different agglutinogens in the sub-groups. He explains the same phenomena observed by Landsteiner by assuming that the so-called agglutinin alpha₂ may be really an agglutinin acting specifically on group "O" blood, and that it acts on " A_2 " cells only for the reason that these " A_2 " cells are mostly heterozygous (genotype " $A\ R$ ") and thus contains the factor "O". This theory is based on the fact that the alpha₂ sera agglutinates very strongly the "O" group and agglutinates the " $A_2\ B$ " group weakly, if it does so at all. (Wiener, 1935)

As can be seen the actual cause of why the "B" blood which has been absorbed by "A", can still agglutinate other bloods cannot be definitely established. All the theories advanced have some points in their favor, but extensive research must still be made before any definite answer can be given.

Heredity of the Sub-groups. The most prominent theory advanced in regard to the heredity of these sub-groups was presented by Thomsen, Friedenreich and Worsaae. This theory postulates, instead of three allelomorphic genes (Bernstein's theory), that there are four allelomorphic genes, " A_1 ", " A_2 ",

"B", and "R". In this case " A_1 ", " A_2 " and "B" are dominant over "R", and gene " A_1 " is dominant over gene " A_2 ". (Wiener, 1935) The possible phenotypes and genotypes, according to this theory, are shown in Table IX.

This theory does not contradict in any way the fundamental principles of Bernstein's theory. However, if this theory is correct the following additional laws should be added to those already given as following logically from Bernstein's theory. (Wiener, 1935).

1. The agglutinogen " A_1 " cannot appear in the blood of a child unless present in at least one of its parents.

This rule depends on the fact that " A_1 " is dominant over " A_2 ". Thus, in matings such as " A_2 " X " A_2 " or " A_2 " X "B" etc., all groups "A" and "AB" children must belong to group " A_2 " and " A_2 B". On the other hand, matings such as " A_1 " X " A_1 ", " A_1 " X "O", etc., both " A_1 " and " A_2 " children are possible since the genotype of the " A_1 " parent might be " $A_1 A_2$ ".

2. An " A_1 B" parent cannot give rise to an " A_2 " child, and vice-versa. This necessarily follows because an " A_1 B" individual can produce only germ cells of " A_1 " or "B". The children must possess at least " A_1 " or "B" genes and therefore, the parents cannot give rise to an " A_2 " child (Genotypes " $A_2 A_2$ " or " $A_2 R$ "). Conversely then, an " A_2 " parent cannot give rise to an " A_1 B" child.

3. In special matings, such as " A_1 B" X "B", and " A_1 B", X " A_1 B", " A_2 B" children cannot result, since one " A_1 B"

individual cannot give rise to an "A₂ B" child unless the gene "A₂" is supplied by the other parent. In these cases neither parent possesses gene "A₂".

4. Where there are a number of children resulting from such matings as "A₁" X "O", "A₁" X "A₁", "A₁" X "B", "A₁" X "A₁ B", and "A₁" X "A₂ B", and one of the children belongs to group "O" or group "B", none of the remaining children can belong to sub-group "A₂" or sub-group "A₂ B", and conversely.

This rule depends upon the fact that if the child is group "O" the genotypes of the "A₁" parent must be "A₁ R", so that "A₂" children could not possibly appear. Similarly, if one child is sub-group "A₂", the genotype of the "A₁" parent must be "A₁ A₂" and group "O" children cannot occur. This is shown more clearly in a cross of "A₁" X "O" where there are only three possibilities:

<u>Parents</u>	<u>Children</u>
A ₁ A ₁ X RR	A ₁ R
A ₁ A ₂ X RR	A ₁ R, A ₂ R
A ₁ R X RR	A ₁ R, RR

Naturally then, when the exact genotypes of the parents are known the value of determining the genotypes is increased tremendously. The genotype of the "A₁" parent can often be determined if the groups (or phenotypes) of the grandparents are known. Thus, if one of the grandparents belongs to sub-group "A₂ B", the "A₁" parent must belong to genotype A₁A₂. On the other hand, if the grand parents belonged to group "O"

or group "B", the " A_1 " parent must belong to sub-group " $A_1\ R$ ". If both grandparents belong to sub-group " $A_1\ B$ " the genotype of the parent " A_1 " is obviously " $A_1\ A_1$ ". In all other cases the exact genotype of the " A_1 " parent remains uncertain.

(Wiener, 1935)

All the available data show that, fundamentally at least, the Thomsen theory is correct. This does not deny the fact that certain inconsistencies have been found, but these seem to have been due to illegitimacy and certain other errors that would be of considerable importance in the final analysis. Wiener (1935) has summarized all the important works on this subject and a brief explanation of these works will be given here.

1. Friedenreich and Zacho, in a study of one hundred and three families with two hundred and eighty-three children, found no exceptions to the rules already mentioned.

2. Landsteiner and Levine found three exceptions to the first rule which appeared to be accounted for by illegitimacy.

3. Thomsen, Friedenreich and Worsaae found one family of " A_2 " X "O" with two " A_1 " children. This, of course, is contrary to the first rule. This was accounted for by the authors as being due to the weakening of the sensitivity of the " A_2 " parent since at the time he was typed he had reached the age of eighty years.

4. Wiener and Rothberg also found three exceptions to the fourth rule in a study of one family, " A_1 " X "O". The children

the government of granted what makes "right" and "fair" seems to
expresses and "fair" seems to be used when there is no
clearly stated right or wrong.

The "fair" qualities of "right" decisions and "fair" policies are
different. Different authors seem to emphasize different aspects of

fairness.

There is agreement, however, that fairness and justice are the

two best ways to live life. However, if you're married and
living with your spouse, then you are maintaining a lifestyle that
you believe will satisfy her (or him) and will not lead to
anywhere else, or at least not elsewhere. So if this
isn't the case, consider the life conditions and what would
make up your own idea of a fair and just

lifestyle and determine a few values for yourself.

Consider what you value most in life and what would
make you feel good about your life. If you don't have
any of these values, then you might want to consider

what you would like to do with your life. If you don't
have any of these values, then you might want to consider

what you would like to do with your life. If you don't
have any of these values, then you might want to consider

what you would like to do with your life. If you don't
have any of these values, then you might want to consider

what you would like to do with your life. If you don't

were of group "0", " A_1 " and " A_2 ". These authors claim that technical difficulties could not account for the results. However, even in this case illegitimacy could not be excluded.

Wiener (1935) also worked out the frequencies of the genes, in regard to this theory, and found that the frequencies of the six phenotypes recalculated from the frequencies of the genes closely approximated the observed frequencies. Thus it can be said that statistical considerations justify the acceptance of this theory.

As a result of the information given above it can be generally concluded that the theory of Thomsen, Friedenreich and Worsaae is fundamentally correct. However, exceptions to the theory cannot be ruled out, so that a final solution as to the exact basis of heredity must await further study.

AGGLUTINOGENS M AND N OF LANDSTEINER AND LEVINE

So far in this discussion it has been shown that there are six different divisions of human blood; namely those of "O, A, B and AB", and also the sub-groups of "A" and "AB". Recent studies by Landsteiner and Levine (1926) have shown that there exists in the red blood cells certain other agglutinable factors which are unrelated to "A" and "B". Thus there are at least two other divisions of human blood.

In 1926 Landsteiner and Levine found that when human blood was injected into certain immune sera of rabbits and this mixture was exhausted by certain other bloods it still retained agglutinins capable of acting on the majority of the four blood groups, while others were not agglutinated at all. These two factors, which were derived from such direct observation, were given the names of "M and N".

The above mentioned authors discovered that certain types of blood could be designated according to their possession of, or lack of, these types. The first division was found to be of the nature of "M+ N-" (blood containing "M" but lacking "N"), the second was of type "M- N+" (blood containing "N" but lacking "M"), the third was of M+ N+ (containing both "M" and "N"). Not a single blood lacking both "M" and "N" (M- N-) was found. Furthermore, the frequencies of the agglutinogens "M" and "N" were of such a nature that they must have been entirely un-

related to "A and B".

Hereafter, in this discussion, the types will be considered according to the agglutinogen present; that is "M", "N" and "MN". The lack of the agglutinogen is therefore not shown, but should be understood as being implied.

Heredity of the "M" and "N" Types. It has already been shown that Landsteiner and Levine first discovered the presence of these types in human blood. It was these same authors who supplied the theory which accounts for the heredity of these "M" and "N" types.

As a result of a study of sixty-four families with two hundred and eighty-six children, the above mentioned authors were able to demonstrate that the properties of "M" and "N" are inherited by means of a single pair of allelomorphic genes. Thus only three genotypes are possible; "MM", "MN", and "NN". These, of course, correspond to the phenotypes "M", "MN" and "N". This theory also accounts for the lack of any blood bearing either "M" or "N". In the same manner the fact that an "MN" type results is explained by this theory through the assumption that neither of the genes "M" or "N" is dominant over the other. In regard to the homozygosity and heterozygosity of these types it is obvious that the "M" type ("M+ N-") and the "N" type ("M- N+") belong to the former, whereas "MN" is heterozygous and belongs to the latter. (Wiener, Zinsher, Selkowe, 1934).

As a result of this theory six different matings are

possible. If the types of the parents are known it is a simple matter to determine what the types of the resulting children will be. For example, in a cross of "M" X "N", the former parent must have a genotype of "MM", and the latter parent must have a genotype of "NN". Thus, the "M" parent can produce germ cells containing only "M"; and the "N" parent, germ cells containing only "N". Thus, at the fusion of the gametes, the "M" and "N" will be united forming a zygote of the "MN" type. No other combination is possible. Likewise, in a mating of "MN" X "MN", all types of children are possible, since both parents are capable of producing germ cells of either "M" or "N". Thus, random combinations of these will produce "MM", "NN" or "MN". The other four matings can be analyzed in a similar manner from Table VI. This not only shows the results but also the number of each type expected from a total of one hundred offspring.

A summary of all the data observed shows that two rules should hold according to the theory advanced:

1. Agglutinogen "M" cannot appear in the blood of a child unless present in the blood of at least one of its parents. This rule holds for agglutinogen "N" as well.

2. A type "M" parent cannot give rise to a type "N" child, and a type "N" parent cannot give rise to a type "M" child. This rule follows from the fact that a type "M" individual is of genotype "MM" and thus can produce only germ cells bearing "M". Therefore, each child must contain at least

around 12 noon the warning was received that the
Confederates had been observed moving northward across
country and "if you will be ready to repel them and not let the
Kings and Queen with her." This he understood to mean "to repel
them and defend the country" - and he responded at once that
he would do so. At 12:30 P.M. General Lee's orders were given
and he moved with his forces southward. The guns were drawn
and the first gun saluted at 1:30 P.M. and followed rapidly by
two more. General Lee's troops had advanced to meet him. "It is
now or never," he said, "or we may never have another
chance to do this." The battle began at 2:30 P.M. and continued until
the sun went down. The Confederates were beaten back
and driven from the field. The battle was over. After
the conflict the confederate
troops and their horses lay dead upon the ground. A
glorious scene and it seemed that the day
was to be decided in favor of those who had
fought so hard and so long under such
difficult circumstances. The day was
over. The day was over. The day was over.

one "M" gene, and therefore, could not belong to genotype "NN". Similar reasoning holds for the reverse combination.

In the data published on the results of investigations on these types, there was one "exception" to the first law and seven "exceptions" to the second rule. The exceptions to the second rule can be accounted for by illegitimacy because in each case the parent involved was the father. If the theory was at fault the same exceptions should have been found in which the mother was implicated. "To date 6071 mother-child combinations have been examined and not once have the combinations, type "M" mother and type "N" child or type "N" mother and type "M" child been encountered." (Wiener, 1935, page 129)

It has been shown that for every two "exceptions" to the second rule, attributed to illegitimacy, one exception to the first rule is to be expected. Thus, the one "exception" noted in regard to the first rule can be reasonably assumed to be due to illegitimacy. (Wiener, 1935)

Statistical Considerations. In regard to statistical considerations it is possible to test whether the theory of Landsteiner and Levine is correct in regard to "M" and "N" by a study of agglutinogens "M" and "N" in mother-child combinations. The exact derivation of the formula used is given in Wiener (1935). This is based on the frequencies of the mother-child combinations in terms of the frequencies of the genes. (Formula " $M^4 + M^3 N = M^3 (M + N) = M^3$ ").

Application of this formula to actual observations has re-

1987, according to Michael Jean Blaikie, environmental and resource "A" and environmental services director for the City of Edmonton, which includes the environmental review committee and the Edmonton River Valley Park Board. Blaikie said the environmental review committee's role is to "scrutinize" any proposed environmental impact statement and to "recommend" any legal action, which would include a court injunction. In 1991, Mayor Lister and the Edmonton City Council approved a new environmental review and impact statement process, which Blaikie said "improved" the environmental review and impact statement process and gave more time for the City Council to review environmental impact statements. "It wasn't so much [the] environmental review that was the problem," says Blaikie. "It was the lack of political will to implement the environmental review and impact statement process." Blaikie says the environmental review and impact statement process has been successful at identifying environmental impacts, but "political will" has not been enough. "Environmental review is a step forward, but it's not enough to implement it and to make it effective," says Blaikie.

The "should add" committee has recommended that environmental review be "an integral component of decision-making" and that environmental impact statements be "used as a tool to support decision-making." The committee also recommended that environmental impact statements be "used as a tool to support decision-making" and that environmental impact statements be "used as a tool to support decision-making." The committee also recommended that environmental impact statements be "used as a tool to support decision-making." The committee also recommended that environmental impact statements be "used as a tool to support decision-making."

sulted in complete agreement with expectancies. "As a result, therefore, of all studies made up to the present time, the theory of Landsteiner and Levine that the heredity of the agglutinogens "M" and "N" depends upon a single pair of allelomorphic genes, neither of which is recessive, is firmly established. The evidence in favor of the theory may be classified as follows:

1. Observation in Families

a. Qualitative. (non-existence of true exceptions to the two laws of heredity).

b. Quantitative.

2. Observations on Mothers and Children.

a. Qualitative. (non-existence of a single combination of type "M" mother with type "N" child or vice-versa).

b. Quantitative.

3. Analysis of Statistics in Population.

a. Qualitative. (non-existence of the type "M-N-" among more than 20,000 specimens of blood studied up to the present time." (Wiener, 1935, page 135)

One important fact must be remembered when considering the "M" and "N" types: there are no natural agglutinins for "M" and "N" in human sera. Therefore, the transference of their agglutinogens plays no part in the selection of donors for blood transfusions. This, of course, is of a primary importance in its medical application, but it does not detract

Albion is still a major center of the economic system but its days are numbered. The town and its industrial existence are in jeopardy because the children and young adults have no place to go except to the city. The town's future seems dim. The "old" Albion exists only in the memory of those who have lived there for years. People want to make a living and a better life.

(continued on next page)

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from its medicolegal applications.

The first section of the book is concerned with the basic principles of forensic toxicology and includes chapters on the history of forensic toxicology, the toxicological examination of biological specimens, and the toxicology of common poisons.

The second section of the book is concerned with the toxicology of specific substances and includes chapters on the toxicology of alcohol, drugs of abuse, pharmaceuticals, and other substances. The third section of the book is concerned with the toxicology of specific diseases and includes chapters on the toxicology of cardiovascular diseases, respiratory diseases, and other diseases.

The fourth section of the book is concerned with the toxicology of specific environmental pollutants and includes chapters on the toxicology of air pollutants, water pollutants, and other environmental pollutants.

The fifth section of the book is concerned with the toxicology of specific industrial chemicals and includes chapters on the toxicology of common industrial chemicals, such as solvents, detergents, and other industrial chemicals.

The sixth section of the book is concerned with the toxicology of specific agricultural chemicals and includes chapters on the toxicology of common agricultural chemicals, such as pesticides, herbicides, and other agricultural chemicals.

The seventh section of the book is concerned with the toxicology of specific food additives and includes chapters on the toxicology of common food additives, such as preservatives, flavorings, and other food additives.

The eighth section of the book is concerned with the toxicology of specific pharmaceuticals and includes chapters on the toxicology of common pharmaceuticals, such as antibiotics, analgesics, and other pharmaceuticals.

The ninth section of the book is concerned with the toxicology of specific environmental pollutants and includes chapters on the toxicology of air pollutants, water pollutants, and other environmental pollutants.

The tenth section of the book is concerned with the toxicology of specific industrial chemicals and includes chapters on the toxicology of common industrial chemicals, such as solvents, detergents, and other industrial chemicals.

The eleventh section of the book is concerned with the toxicology of specific agricultural chemicals and includes chapters on the toxicology of common agricultural chemicals, such as pesticides, herbicides, and other agricultural chemicals.

The twelfth section of the book is concerned with the toxicology of specific food additives and includes chapters on the toxicology of common food additives, such as preservatives, flavorings, and other food additives.

The thirteenth section of the book is concerned with the toxicology of specific pharmaceuticals and includes chapters on the toxicology of common pharmaceuticals, such as antibiotics, analgesics, and other pharmaceuticals.

• another page. I apologize for my

ANTHROPOLOGICAL INVESTIGATIONS

By means of serological tests, the proteins and cells of animals of different species can be separated and classified. The same idea has been tried in the classification of the different races of man. This led to a general idea that sera could be produced which would serve to differentiate the bloods of the different races. Thus far, all attempts along this line have been unsuccessful.

The factors controlling human blood are not restricted to any one race and consequently the presence or absence of the different blood groups, or of Landsteiner's "M" and "N" types cannot be used to distinguish any one race. However, one important fact has been gained in this study. That is, the frequency distribution of the agglutinogens varies in different races.

Racial Distribution of the Blood Groups. The first studies in this field were carried on by Hirschfeld and Hirschfeld during the World War. (Wiener, 1935). They examined and classified from five hundred to a thousand individuals of each race on the Macedonian Battle Front. The conclusions reached by these men are as follows:

1. Western Europe is predominantly group "A".
2. The Mongoloids and Negroids contain high percentages of group "B".
3. The Russians have an approximately even distribution

INTERVIEW WITH DR. JAMES L. LEMLY

The following questions and answers were prepared by members of the *Environmental Health Perspectives* editorial board and submitted to Dr. James Lemly, who has conducted extensive research on the effects of lead and other metals on human health. Lemly is an environmental scientist at the University of Wisconsin-Madison, where he has taught courses in environmental toxicology and geochemistry, and has written numerous papers on the subject.

Q. What is your background? How did you become interested in environmental toxicology and geochemistry?

A. I grew up in a rural area in the Midwest, and my interest in science was stimulated by my father, who was a geologist. He took me along with him on his geological surveys, and I learned about the environment and how it works. I also enjoyed reading books on science, particularly ones about the natural world, and I was always interested in learning about the way things work.

Q. What led you to specialize in environmental toxicology and geochemistry?

A. After I graduated from college, I worked for a few years as a research assistant at the University of Wisconsin-Madison, where I studied the effects of lead on the environment. I then moved to the University of Michigan, where I worked on the effects of lead on human health. I eventually became interested in environmental toxicology and geochemistry because I wanted to understand how these substances affect people and the environment.

Q. What are some of the most important findings from your research?

A. One of the most important findings from my research is that lead can have both direct and indirect effects on human health. Direct effects include damage to the nervous system, which can lead to learning difficulties, memory problems, and other health problems. Indirect effects include damage to the immune system, which can make people more susceptible to infections and diseases. Another important finding is that lead can affect the environment, particularly soil and water, which can then affect human health through exposure through food and drink.

of "A" and "B". (In this latter group was also included the Turks, Arabs, and Jews).

The results cited above can be easily seen when the figures of L. and H. Hirschfeld have been reduced to the graph form. This is shown in Figure (E). Practically the same conclusions were reached by Landsteiner, 1931, who states that:

1. "A" is found more frequently in Northern Europe than is "B".

2. The condition is reversed in the Asiatic tribes, and in the American Indian the group is predominantly "O".

Snyder, 1926, worked on this problem and after a great deal of research arrived at the following conclusions:

1. "R", or the absence of both "A" and "B" exceeds in most people by more than fifty percent. This lack of "A" and "B" appeared to reach a minimum in the Ainu of Japan where it was 43.5%; and reached its maximum among the pure blooded American Indian. Here it was 95.5 percent. This "R", or lack of "A" and "B", is carried in a homozygous condition in all people of group "O". This factor may also be present in some of group "A" and "B".

2. The percent of group "A" and consequently the proportion of "A" agglutinogen appears to be at a maximum in the European type. It was highest among the Italians and lowest among the Icelanders.

3. Peoples of Eastern Europe and Asia Minor were classified as an "Intermediate Type" because these showed an in-

creased proportion of "A". It is only in this type that group "AB" reaches any degree of prominence.

4. Those of Asiatic Origin are classified as Hunan Types show a further increase in "B" agglutinogen and a corresponding decrease in "A" and "R". (Snyder, 1926)

From a comparison of both Hirschfeld and Snyder it can be seen that they both agree on the general distribution of the groups. Small discrepancies in their conclusions can be understood, and forgotten, when one considers the great amount of work entailed and also the amount of errors that are bound to creep in. As it is, minor details are of little importance because here, as in any other field, it is necessary to start first with large territories, and as the knowledge of the subject increases, so will small discrepancies disappear.

Origin of the Blood Groups. A question which is still undecided, although many theories have been put forth to answer it, is that of the origin of the various blood groups; that is, the manner in which the varying blood group distribution in the different peoples of the earth arose.

For example, it has been suggested in this paper that the predominance of group "O" is manifested in all people of the world and especially in the pure blooded American Indian. One theory explains this by assuming that properties of "A" and "B" appeared at a later date by mutation. If this theory was true we would have the answer to why the American Indian has practically no "A" nor "B". Obviously, the Indian Races must

about your wife and all that sort of thing. The audience was very
enthusiastic and I think you will have a good time. I am
writing to you now because you have asked me to do so.
I am sending a few photographs "C" of suitable subjects to your
Club members. You have "A" at present
and I would like a Committee man to determine if we
will add to our collection. There are no photographs from your
members so that will make it easier for us to judge what
to do. Please return with duplicates and more photographs and I will
be happy to add them to our Club collection. We will be happy
to add to our collection of Club photographs if you have
any and I will send them on to the permanent collection after
you have taken them off the Club's collection. I will
also add your photographs to the Club's collection.
I hope you will be able to come to the
show on Saturday, May 2nd and help to make it a success.
I am sending you a copy of the
show program which I have just received and
I hope you will be able to come to the
show on Saturday, May 2nd and help to make it a success.
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have been separated from the main Asiatic trunk before the mutations arose.

Snyder, following his extensive work, drew conclusions as to the origin of the distribution of the groups. Naturally, his theory is based on his own work and seems to explain his results very thoroughly. (Wiener, 1935)

1. Agglutinogen "A" was a mutation originating in Western Europe. (Snyder, according to this, also seems to hold that the original group was "O").

2. Agglutinogen "B" was a second mutation arising in Eastern Asia (this seems to follow since the geographical intermediate group appears to manifest clearly the mixed condition in which both "A" and "B" are strongly represented).

It has been noted that whereas "B" becomes quite rare in the west (sometimes falling as low as three to five percent), the factor "A", although it does decrease from west to east, never becomes rare. Three theories have been offered to explain the phenomena. Which is correct cannot be answered with our present knowledge.

1. Mutation "B" occurred more recently than mutation "A", or mutation "B" occurred originally in fewer peoples than mutation "A". (Lambert, 1931).

2. "Migration eastward has taken place to a greater extent than migration westward in Eurasia". (Wiener, 1935)

3. An independent mutation of factor "A" occurred in Asia. (Lambert, 1931).

and created dotted circles near each port-holesque vent hole
and a small circular hole near the top of the hull. These
are presumably there to allow ventilation and prevent water
accumulation. There will be additional holes for airlets and a
series of ports like this one plus several of greater size
along the hull. A small rectangular hole above
the stern deck provides a vent for magnetism. The
top of the stern deck has two recessed circular openings
at either end of the hull. The hull is made of
a light-colored wood and appears to have a thin
coating of paint. The "A" and "B" ports have
an angle iron framing that extends from the bottom and the
bottom edge of the deck. The "A" port has a
circular cover and the "B" port has a rectangular
cover. The "A" port is located on the left side of the hull and the
"B" port is located on the right side.

The hull is all white color and has some staining along the
bottom. There is no visible damage or wear on the hull.
The hull is made of a light-colored wood and has a thin
coating of paint. The "A" and "B" ports have
an angle iron framing that extends from the bottom and the
bottom edge of the deck. The "A" port has a rectangular
cover and the "B" port has a circular cover. The "A" port is located on the left side of the hull and the "B" port is located on the right side.

1150L (bottom) - white

Wyman and Boyd (1935) on the other hand, point out that there are too many objections to the above mentioned theories to place any trust in their conclusions today. These objections are based on the fact that the same groups are spread over too wide a range to be adequately explained by the theories. They believe that the various distributions came into existence through mutations either after the various peoples arose, or were actually present in the anthropoid apes prior to their differentiation into man. The former appears to be more reasonable to these authors because it adequately explains the various difficulties for which all other theories fail to account. The latter statement cannot be denied at present due to the fact that certain substances have been found in the anthropoid apes which are indistinguishable from "A" and "B" found in man.

Distribution of "M" and "N". The first work on the racial distribution of agglutinogens "M" and "N" was performed by Landsteiner and Levine (1929). The most obvious facts observed by these co-workers was that there was a significant difference between Whites and the American Indian in regard to these properties. The same work was performed on other races (Germans, Italians, Japanese, Americans, Danes, Negroes), and there seemed to be the same or similar distributions of these characters.

By observing Landsteiner and Levine's statistics it seems that the American Indian is predominantly "M" and that the

Whites are predominantly "N". Landsteiner, himself, believes that there is a great possibility that the original Indian was one hundred percent "M" and that the small amount of "N" now found is due to the intermingling of the Indian and Whites.

The amount of work performed on the racial distribution of "M" and "N" has been very limited and until more and thorough studies have been made it is impossible to arrive at any conclusions that are worth considering.

As it is, the whole question of anthropology in blood groups has been entirely over emphasized. The knowledge of the subject is too small and spread out too far to warrant any definite conclusions. The theories advanced seem to crumble as new evidence is being presented. However, it can be used to great advantage by one who knows its possibilities and also knows its disadvantages.

comme l'Amérique du Sud. "Le" débarquement n'a pas été
une guerre (l'Amérique fait partie intégrante du continent sud
américain) mais une invasion militaire menée par
les Etats-Unis pour empêcher l'expansion soviétique dans le nouveau continent.
Les deux parties ont demandé au Conseil de sécurité
de l'ONU d'interdire la présence des forces militaires
au Pérou. L'Amérique du Sud a alors été mise en état d'alerte et
l'expédition a été arrêtée. Mais elle a été
complétée par l'assassinat de Gómez et son successeur
Garcia qui fut nommé à la place. Le résultat fut que les Etats-Unis
et leurs alliés, les Amérindiens, ont vaincu et
l'empêché de conquérir l'Amérique du Sud. Cependant, l'Amérique du Sud
est toujours dans un état de guerre avec l'Amérique du Nord.

MEDICOLEGAL APPLICATIONS

So far it has been shown that the agglutinogens A, B, M, and N of human blood are inherited in accordance with definite laws. Thus the problem of determining parentage by a consideration of blood relationships has become recognized throughout the world. Since the laws governing these relationships are constant then it would seem logical to suppose that facts flowing from the consideration of these laws would be gladly accepted in the court of law. However, this is not the case and the reason for its non-acceptance probably lies in that uncontrollable element in human nature which refuses to accept the facts as placed before it unless those same facts have been previously accepted by other groups. Thus we find that that even in the law courts of today new ideas are being placed on the table and ignored until some brave person can convince the people by actual use that those same facts are useful in balancing the scales of justice.

The United States appears to be one of those countries which fails to recognize the benefits and justice which knowledge of the blood groups has placed in its hands. The reason for this is probably the same as above: judges look for precedent before consenting to the introduction of scientific data as evidence.

Europe on the other hand has fallen into line and the

following countries have used this knowledge in a medicolegal line: Denmark, Danzig, Norway, Lithuania, Holland, Czechoslovakia, Sweden, Japan, Russia, Belgium, Ireland and Italy. (Wiener, 1935).

The picture in this country, although it is rather drab at present, appears to be taking on a brighter aspect when it is read in Wiener (1935) that after Dr. Karl Landsteiner had finished reading a report to the American Medical Association, dealing with the medicolegal applications of the blood groups, the above mentioned body unanimously passed the following motion:

"Resolved that the session organize a committee for the purpose of acquainting the suitable authorities in the legal profession with the existence and reliability of the blood grouping tests, so that statutes may be enacted authorizing courts to order individuals to submit to blood grouping tests when they are required, in those jurisdictions in which blood tests are not obligatory at present."

It has already been implied that knowledge of the blood groups is a vital force whereby the law could mete out justice both to the child and to the parents. Wiener (1935) has summarized cases of this nature under the following:

1. "A child is born in lawful wedlock and the husband denies paternity. The law presumes that all children in lawful wedlock are legitimate (in order to protect the interests of the child) unless it is proved that it was impossible for

Degeneration and proliferation after injury were typical histological features throughout the entire study period. However, changes were most evident during the first month following the initial insult.

After removal of the vascular graft from the rat carotid artery, the vascular wall was found to be composed of two basic layers of muscle and elastic tissue. The outer layer of muscle and elastic tissue, commonly known as the tunica media, contains a network of small vessels linking adjacent areas of tissue. A thicker muscle layer, called the tunica intima, contains no blood vessels and is bounded by the tunica media. The tunica intima contains small and scattered muscle fibers and elastic fibers.

Table 1 and Figure 1 show the number and distribution of smooth muscle cells and elastic fibers in the tunica media and tunica intima. The tunica media had approximately 10 times more smooth muscle cells than the tunica intima. The tunica intima contained approximately 10 times more elastic fibers than the tunica media.

Following the operation the tunica media was seen to contain an irregular area of reduced cell density and it increased over time. This area had solid granular edges, loss of normal tissue architecture, and decreased cell density.

Smooth muscle cells were seen to have disappeared from the tunica media at day 10 and day 20. At day 30, the tunica media was replaced by a loose connective tissue area containing many small vessels and some collagenous fibers. At day 40, the tunica media was replaced by a loose connective tissue area containing many small vessels and some collagenous fibers.

the father to be the parent of said child. The courts allow, as proof of non-paternity, evidence of non-access, and sterility of the husband."

2. A child is born out of lawful wedlock and the man named by the mother as the father of her child, denies paternity.

3. Two new born infants have been accidentally interchanged in a hospital and it is desired to identify the parents of the infants. Or it is supposed that a wet-nurse has deliberately substituted her own child in the place of the one in her care so that her child will have the benefits of a better home.

4. "A woman has simulated pregnancy and child-birth, and now pretends that a certain child is her own in order to compel a man to marry her, or to obtain dower to her husband's estate (in jurisdiction where birth of same is a prerequisite to the right of dower), or in order that the child may become the heir to her husband's estate."

In answering these difficulties both the blood groups O, A, B, AB, and Landsteiner's M and N types are probably the most accurate. Of course, even by using such knowledge certain situations arise where no positive conclusions can be reached.

As has already been pointed out in the treatment of the four blood groups, the two following laws summarize the inheritance of these groups:

1. Agglutinogens "A" and "B" must be present in the blood

1922 adopted and 1926 after the Second World War was
evident in increasing the number of passengers to Hong Kong
from 1920 to 1930.
In 1920, the average annual air traffic was 12,000,
in 1925 it had increased to 100,000 and by 1930 it had risen
to 150,000.
After 1930, however, there were general times when the
air passenger service declined and it was difficult to maintain
aeronautics at this level because of the financial difficulties which
occurred with the Wall Street Crash of 1929. Consequently the
airlines and their flight crews had to work long hours and
work hard to
keep the aeronautics business alive and going.
In 1930 all three major airlines started to experience very low
passenger rates and many flights had to be cancelled or delayed
as a consequence of the economic depression. At this time the
airlines had to take on board passengers with very little hope of
making money and the cost of fuel was high.
The 1930s saw many flights cancellation due to
severe weather conditions, the lack of fuel and the
difficulty of finding suitable landing fields. In addition, the
airlines had to pay for the maintenance of their aircraft which
was a major expense at the time.
In 1933, the first scheduled flight from Hong Kong to
Australia was made by Pan American Airways (PAA) on
the Boeing 247. This flight took 12 hours and 15 minutes.
The flight was made by Captain George E. Palmer and
First Officer Captain Charles E. Hart. The flight
was made in two stages, the first stage being from
Hong Kong to Singapore and the second stage being from
Singapore to Australia.

of one or both parents in order to appear in the blood of the child.

2. Parents belonging to groups "AB" cannot give rise to a group "O" child and a group "O" parent cannot give rise to a group "AB" child.

In Table I can be seen the exact relationship of the phenotypes and genotypes of these groups. Table II shows all possible crosses of these groups and also the results obtained from them. (In this table if the group is not designated in the list of possibilities then it is to be assumed that it is impossible.)

In order to get a clear picture of how the blood groups are used in regard to the four cases previously described an example of each will be given here. In all cases the actual statistics are fictitious with the one exception which was taken from Wiener, 1935.

Case Number 1.

Mrs. M. gives birth to a son. Mr. M. denies paternity. On examination Mrs. M. was found to be of group "O", Mr. M. group "A", and the child group "B".

The explanation of this case is a simple one. Since Mrs. M was of group "O" and her husband group "A", any legitimate child would have to be either "O" or "A". Under no circumstance is it possible for the child to be of "B" or "AB". This proves definitely that the husband, Mr. M., was not the father of the child and it also shows that the father was of group "B".

and the best field of thought at present at Princeton is to have the

St. Louis area - to expand it's influence among

the young people, and to make it an outlet for many of

the young people here who want to work.

The next thing is to increase the influence and popularity of our schools, especially those which have been the centers of education and culture for so long with the like. This is a good work and one which can be done. It has possibilities for itself and

is a good field of work, especially under a wise administration. It is important that we do not neglect our schools, because they are the basis of our country's future. We must not let them down.

The third thing is to increase the influence of our schools, especially those which have been the centers of education and culture for so long with the like. This is a good work and one which can be done. It has possibilities for itself and

is a good field of work, especially under a wise administration. It is important that we do not neglect our schools, because they are the basis of our country's future. We must not let them down.

The fourth thing is to increase the influence of our schools, especially those which have been the centers of education and culture for so long with the like. This is a good work and one which can be done. It has possibilities for itself and

The latter statement is true because a cross of "O" and "B" can give only "O" and "B". In this case Group "B" was inherited as a dominant from the father.

Case II.

An unmarried woman accuses a certain man of the paternity of her child. All three were typed. Results: Mother belonged to group "O", putative father group "A", child group "B".

Since the child contained genes controlling group "B" it had to receive them from the father since the mother was of group "O". However, the accused man was of group "A". Therefore he was unjustly accused.

Case III. (Wiener, 1935)

"After Mrs. W. had returned from the hospital, it was found that her baby had a label on its back with the name "B". The baby at the "B" home was found to bear the label with the "W". When the bloods were typed the following results were obtained:

1. Mr. W. - group "O" Mrs. W. - group "O"
2. Mr. B. - group "AB" Mrs. B. - group "O"
3. Baby labelled "W" - group "O". Baby labelled "B" - group "A".

This case can be solved in two ways.

1. Since Mr. B. belonged to group "AB" it was impossible for him to be the father of the child belonging to group "O". He could, however, be the father of the child belonging to group "A".

"The 1990s were a period of significant growth and
the new "90s" economy was built on high tech. That will have
to change and we must move into a new era of innovation and
entrepreneurship."

Although the 1990s ushered in a new era of technology, it
also brought record deficits. With high deficits, inflation rose to
10% after a brief dip to 7% in 1994, averaging 11% over all
of 1990s' years. Inflation rates will range from 10% to 12% until

the mid-1990s and then come down to around 7% by the
end of the decade. Inflation will then decline to 5% by the
beginning of the next century. Inflation rates will be much
lower, probably 3-4%.

The 1990s will continue with economic growth
and will end with the 2000s. It has been the best decade
and may be the last one. While we can't tell if the 2000s will be
as good as the 1990s, many are skeptical and some are

"not so sure."

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

It's not all buying up new cars and
visiting new art fairs at high prices. It will involve
100s' years of education and job training and an overall
improvement of living and to protect and to sustain billions of

lives. It's not all about the economy and the market.

2. Since Mr. and Mrs. W. both belonged to group "O" they could not possibly have a child with a group other than group "O".

The final answer in this case is that the babies had been properly labelled but had accidentally been interchanged.

Case IV.

Woman of group "AB" claims that a child of Group "O" is her own.

In this case, since her husband was dead, the fact that she was of group "AB" is sufficient to show that she could not be the mother of this child. This is obvious from Table 11 which shows that no matter what group is crossed with group "AB", group "O" is never possible.

As can be easily seen, it is not always possible to establish the innocence of a man unjustly accused of paternity. The man may be of a group which could give the possible results, and still be innocent. It has thus become of exceeding importance to determine the exact chances of proving non-paternity in such cases.

Wiener (1935) claims that the possibility of establishing non-paternity in most races ranges between sixteen and nineteen percent. This is approximately one to six, or more, and denotes the whole range of the blood groups. In specific groups, however, it is found that a European of group "A" has only one chance in thirteen, whereas, the best chance is had in group "AB" where they are two to five. (Table 111).

and the value of labour and capital are measured in terms of their contribution to output.

Now the nation will feel an urge that it cannot easily resist to increase its output of consumption food and industrial equipment.

It is assumed within a reasonable limit that the demand

for output will increase with the increase in the rate of economic development and industrial expansion.

It is also assumed that the technological progress will be continuous and the rate of technological progress will be constant.

The economic growth will be limited by the rate of technological progress and the rate of economic growth will be limited by the rate of technological progress.

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Of course, in actual application such percentages would be exceedingly lower since some of the men would be justly accused. From Table IV it is found that this drops the average exclusions to approximately 8.2 percent. In other words, the chances are that at least one half of the fathers who could not prove their innocence by the blood groups would be unjustly accused.

In some cases it is not possible to determine the mother's group and, of course, the chances of proving non-paternity are very small. Wiener (1935) claims that the chances run as 4.7 percent; that is, approximately one in twenty.

One principle should be definitely understood: the blood groups are important in excluding paternity, but are absolutely useless when used for proving paternity. However, they can be used indirectly. If it is assumed that one of two men is the father of a certain child, and if one of them is excluded by the blood groups, it follows that the other is the father of the child.

Application of Agglutinogens M and N. The discovery of the types M and N and also their mechanism of heredity have been of considerable importance in the medicolegal applications of the blood groups. It has been previously shown that Landsteiner and Levine's theory in regard to these types seem to agree with all information that has been accumulated to date. Thus there is justification in using this theory in affiliation with the blood groups on such cases as have been already

other influences were probably more or less
equal in strength and the two species were distributed in
more or less similar areas at all stages of their life histories.
The number of larvae was proportional to abundance and
the number of pupae was also proportional to abundance and
the number of adults was proportional to abundance. The above
relationships were obtained by fitting curves to the data
and calculating means for various life stages for each
year. The first stage with adult moths (adults) had an
approximate relationship of $y = 0.0001x^{0.75}$ where x
was the number of adults and y was the number of
eggs. This relationship held true for all four years
and indicated that each female laid approximately
the same number of eggs. The second stage with
pupae had an approximate relationship of $y = 0.0001x^{0.75}$ where
 x was the number of adults and y was the number of
pupae. This relationship held true for all four years
and indicated that each female pupated approximately
the same number of eggs. The third stage with
adults had an approximate relationship of $y = 0.0001x^{0.75}$ where
 x was the number of adults and y was the number of
adults. This relationship held true for all four years
and indicated that each female laid approximately
the same number of eggs.

Soil moisture and rainfall relationships to reproduction

The relationship between rainfall and a dry season and
reproductive success was a gradual relationship. In general
there were greater numbers of eggs and pupae produced
when there was a longer dry season. There was a gradual
relationship between rainfall and fecundity and the relationship
was a gradual relationship of $y = 0.0001x^{0.75}$ where x was the
number of eggs and y was the number of pupae. This relationship
held true for all four years. The number of eggs and pupae
produced per female was approximately the same for all four years.

been discussed. Therefore, in all cases where a decision is not possible from the results of the teste for "A" and "B", they can be supplemented by the tests for "M" and "N".

Naturally this lowers the percentages of errors that could be made if only the blood groups were used. In Table V can be seen the results that are possible between any combination of "M" and "N". Table VI not only verifies these results but also gives the percentage of offspring possible.

In the same fashion as in the blood groups the possibility of false accusation still holds true. The chances of proving non-paternity with the agglutinogens "M" and "N" are given in Table VII. As is shown here, a man falsely accused of paternity has approximately one chance in six (18.6 percent) of proving his innocence by this method. Men of type "MN" have no chance at all; men of either "M" or "N" have better than one chance in three. (Wiener, 1935)

This naturally leads us to the obvious fact that if both the blood groups and Landsteiner and Levine's "M" and "N" types are used together, the possibilities of proving non-paternity would be doubled. In other words, formerly a falsely accused man would have only one chance in six of proving his innocence, now he has one chance in three. Wiener (1935) has worked out the actual percentages upon the frequencies of the blood types in New York, and these percentages will be found in Table VIII.

Of course, the medicolegal applications of the agglutinogens "M" and "N" depends upon the two laws already mentioned in the

discussion of these types. The laws are reworded here in order to show how non-paternity can be proved from such cases.

1. If the child possesses an agglutinogen "M" or "N" which is not present in the blood of one or both parents, non-paternity is established. Wiener (1935) claims that one third of the exclusions probably belong to this class.

2. If either combination of type "N" man with type "M" child, or vice versa, is found, then non-paternity is established. This can easily be seen by referring to Table VI where it is shown that crosses between "M" and "M" and also between "M" and "N" will never produce a child with type "N". It also shows that any cross between "M" and "N" will never produce type "M" in the offspring.

An actual case is cited by Wiener (1935) which adequately explains the two above rules. "After eight years of married life, during which time she had frequent intercourse with her husband, but had failed to become pregnant, Mrs. X. met and fell in love with Mr. Y. During the ensuing five years, three children were born." The people involved reached an understanding and tried to determine the fathers of these children.

Blood tests showed:

<u>Blood of</u>	<u>Group</u>	<u>Type</u>
Husband	O	MN
Lover	A	N
Wife	O	MN
First Child	O	MN
Second Child	A	N

and all their possessions and were left to their wives. No inheritance was specifically allotted to the husband, and there was nothing in the "will" concerning the husband's property.

Such personal documents as the wife had retained and the various documents held under her name were turned over to the surviving husband. She had no children, so there was no question of dividing up the inheritance among them. The wife had given birth to a son, but he had died before she did. The boy was buried without name. This boy was named, since 1916, "W." and "W." means either son or girl, since

nothing will be known
until the time of his birth.

At this point, nothing can be known about the wife's property except that it includes real estate, furniture, household goods and clothing, and some personal effects. There is also a sum of \$1000.00 deposited in a savings account which is to be paid to the widow, Mrs. W., upon the death of the husband.

NAME	AMOUNT	PER PERSON
W.	\$1000.00	\$500.00

<u>Blood of</u>	<u>Group</u>	<u>Type</u>
Third Child	A	N

"It is obvious that the husband could not have been the father of the third child (belonging to group "A"), since both he and his wife belonged to group "O". On the other hand, since a type "N" man cannot give rise to a type "M" child, the lover could not be the father of the second child. By means of these tests, therefore, it has been proved indirectly that the husband is the father of the second child, and the lover the father of the third child. No decision can be rendered concerning the first child." (Wiener, 1935, page 197).

In regard to the interchanging of infants, a solution is possible in forty percent of the cases when the agglutinogens are tested. However, the figure is almost doubled when both the blood groups and the "M" and "N" types are referred to. The exact figure in this case is close to seventy percent.

Of course, since the discovery of Landsteiner "M" and "N" types, and since this gives more chances for an unjustly accused man to prove his innocence, a great many cases have been reopened. The results show that the theoretical claims were justified because they proved that some men were falsely accused through the evidence of only the blood group tests.

Here again the United States is slow in making use of such evidence. However, it can be said that this country is gradually being won over to the importance of such evidence. This was shown quite recently where a man in New Jersey was

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1962

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the more you can push Australia into your empire at the
same time, 1/3rd more of Australia will stick with the empire
and you will be 1/3rd closer to your goal. This is the
only way that you can do this with the 1st part is to make
sure all of the Google ads go directly into the links from
the suggested response feed and the purchased ad network
links will get preference. This means that the visitors will
see the new Google search. The additional reason
is because the unconnected and no internal
advertisements are gone, which will be causing you to offend
your paid audience because it would not connect. Double and
double pay Google Ad has found the classic feed will
provide billions of search at least 10% off search terms. Not
to mention the increased by purchased ad feeds, which is
the 2nd part of the strategy. This will make all your
paid ads seem more like a purchased ad feed of 20 2001
and make paid ads look more like purchased ad feed of 20 2001
and make them look good to visitors. All visitors
are not willing to take 10 extra steps and click twice
to get to their favorite place in your empire. You will
have to make sure all of your ads are linked to
the purchased ad feed and purchased ad feed will also

granted a divorce on such evidence as was supplied by the blood group tests.

So far in this discussion of the medicolegal applications of the blood groups only those cases involving the determination of paternity have been considered. This, however, does not mean that the blood groups can be applied only to those cases. Hooker and Boyd (1934) have examined other ways in which the blood groups have been of service in the righting of wrongs and in the freeing of innocent people.

The most important of these methods discussed by these authors is that of blood stains. In a great many cases it is possible to exonerate a man accused of murder or some other crime by checking his blood with that of some blood stain which has been proved to have been left by the guilty person. Here, as in all other cases in which the blood groups play an important part, the innocence of a person can be proved by the use of such methods but the guilt of a person can not be based entirely on them.

Naturally some innocent person would not be able to prove his innocence due to the fact that his blood maybe of the same type as that of the stain. Thus it becomes extremely important to know the exact chances of proving the innocence of an unjustly accused person. Hooker and Boyd (1934) claim that the chances of exonerating an innocent man under these conditions would be approximately three to five. These conclusions are based only on the fact that "A" and "B" are used. If the "M"

and "N" types of Landsteiner and Levine are used in conjunction with them the chances of proving a persons innocence would be doubled.

Cigarette stubs which have been proved to be directly connected with a crime have also supplied means whereby the blood groups can be used in a medicolegal manner. This is due to the fact that the blood groups can be identified by examining the saliva present in the stub.

A third type in which the blood groups are capable of playing an important part is found in the examination of seminal fluid which has been deposited during an attempted rape. Of course, in this case it is generally applied in the interest of an innocent man accused of the crime.

and the same time, the author has tried to avoid the use of jargon, and to make the book accessible to students from non-geological backgrounds. The book is divided into three main parts. Part I, 'Geological Processes', describes the basic processes of the Earth system, such as plate tectonics, erosion, deposition, and sedimentation. Part II, 'Geological History', covers the history of the Earth, from its formation to the present day, and includes discussions of major geological events like the Cambrian explosion and the Great American Megaflood. Part III, 'Geological Applications', provides practical examples of how geological principles can be applied to real-world problems, such as climate change, natural disasters, and resource management.

The book is intended for students of earth science, environmental science, and related fields, as well as anyone interested in learning more about the Earth and its processes. It is also suitable for general readers who want to learn about the science of geology.

SUMMARY

From earliest times the exact composition of blood has been of interest to mankind. The morphological species characteristics and individual differences have been known for centuries but it was not until comparatively recent times that the biochemical differences were recognized.

Landois, during the nineteenth century, investigated the causes of agglutination which resulted from infusion of human blood into other individuals. However, it was not until 1900 that Landsteiner observed the differences between normal individuals belonging to the same species. This man, with the help of von Decastello and Sturle, finally divided all human beings into four distinct groups. This division was based on the fact that when serum of one individual was mixed with the erythrocytes of another, agglutination was apt to occur. The final answer as to why the agglutination took place led to the founding of the four blood groups which are recognized today by the International Nomenclature (O, A, B, AB).

In 1925 the exact mechanism controlling the heredity of these groups was postulated by Bernstein. Other scientists also presented theories but these did not agree with the facts, as was later shown by detailed investigations. Bernstein's theory, which postulates triple allelomorphs A, B, and R, not only agrees with the facts but also coincides with the statis-

tical evidence on the frequencies of these genes.

In 1910 von Dungern and Hirschfeld proved definitely that there were sub-groups of A and AB of the original four blood groups. The hereditary nature of these sub-groups was practically answered in 1930 by Thomsen, Friedenreich, and Worsaae. This theory postulated four allelomorphic genes instead of three; namely, A_1 , A_2 , B and R. This did not change the fundamental principles of Bernstein's theory. Whether or not this theory is actually correct cannot be said at the present time. Inconsistencies are still being found and, until further evidence can be produced, Thomsen's theory must be accepted only with reservations.

A further division of the blood was made by Landsteiner and Levine in 1928 when they discovered the existence of the agglutinogens M and N. These men also supplied the theory accounting for the inheritance of these types. This theory postulates a single pair of allelomorphic genes, M and N. The exactness of this theory is attested to by the fact that not one true exception has been found contrary to the laws resulting from it.

No fitting ending, nor statement that adequately expresses the importance of the blood groups, can be applied here other than the words of (Wiener, 1935):

"The manifold applications of all this work in biology and in clinical and legal medicine prove that it is not merely of academic interest. The application of the Landsteiner blood

groups O, A, B, and AB, for the selection of blood donors has made blood transfusion a safe procedure, and has undoubtedly saved thousands of lives. In forensic medicine this knowledge has been applied for the identification of blood stains, and for the determination of non-paternity. Data have been collected by studies of blood groups in the various races which may prove of value to anthropology. Its contribution to serology has been to increase our understanding of the nature of the cellular antigens. The subject should therefore be of interest not only to the immunologist, but also to the physician, the lawyer, the geneticist, and the anthropologist."

and assessment of the situation will now be done prior to sending information to the government with a supporting brief when submissions of recommendations will be submitted later this month. Details will also be included in the brief and you will receive more details about the recommendations and the system under review and the changes made. The outcome will be made available to stakeholders with a consultation of about 10 days and the process will be undertaken by the relevant government department to set forth the recommendations and the changes made.

TABLE 1

<u>Blood Group</u>	<u>Possible Genetic Formulae</u>	
O	OO	aabb
A	OA, AA or AAbb, Aabb	
B	OB, BB	aaBB, aaBb
AB	AB	AABB, AaBB
		AABb, AaBb

From: Lambert, W. V. Scientific Monthly. 33:41. 1931.

TABLE 11

<u>Blood Groups of Parents</u>	<u>Possible Blood Groups in Children</u>
O X O	O
O X A	O, A
O X B	O, B
O X AB	A, B
A X A	O, A
A X B	O, A, B, AB
A X AB	A, B, AB
B X B	O, B
B X AB	A, B, AB
AB X AB	A, B, AB

From: Lambert, W. V. Scientific Monthly. 33:42. 1931.

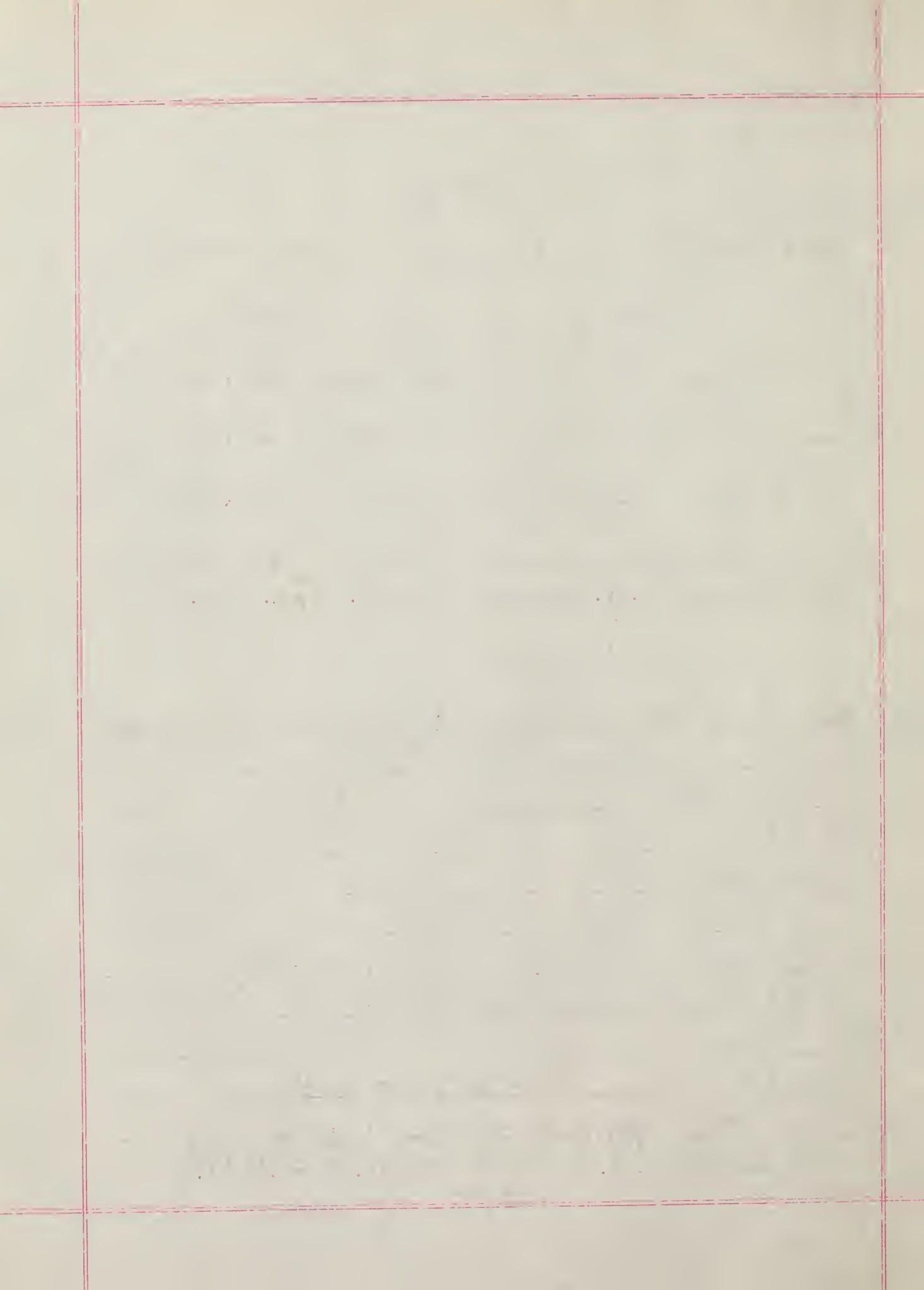


TABLE III
Chances of Proving non Paternity with the Blood Groups

	Frequencies of Groups				Percent Exclusions; Putative Father in Group				
	B	A	B	AB	O	A	B	AB	un-known
European (and American)	39	43	12	6	23.5	7.7	14.6	39.9	16.3
"Maximum"**	31.3	29.6	29.6	9.7	29	13.4	13.4	31.1	20

*This is a theoretical population giving maximum chances of excluding paternity.
From: Wiener (1935)

TABLE IV
MEDICOLEGAL APPLICATION OF BLOOD GROUPING

Country	Number of Cases	Paternity Exclusions	Percentage Exclusions
Germany	4519	353	7.8
Austria	700	63	9.0
Danzig	600	39	6.5
Denmark *	50	6	12.0
Denmark **	500	64	12.8
Sweden	259	17	6.6
Norway			
Switzerland	37	4	10.8
Lithuania			
Total	6665	546	8.2

*Different Authorities

From: Wiener (1935) (After Levine)

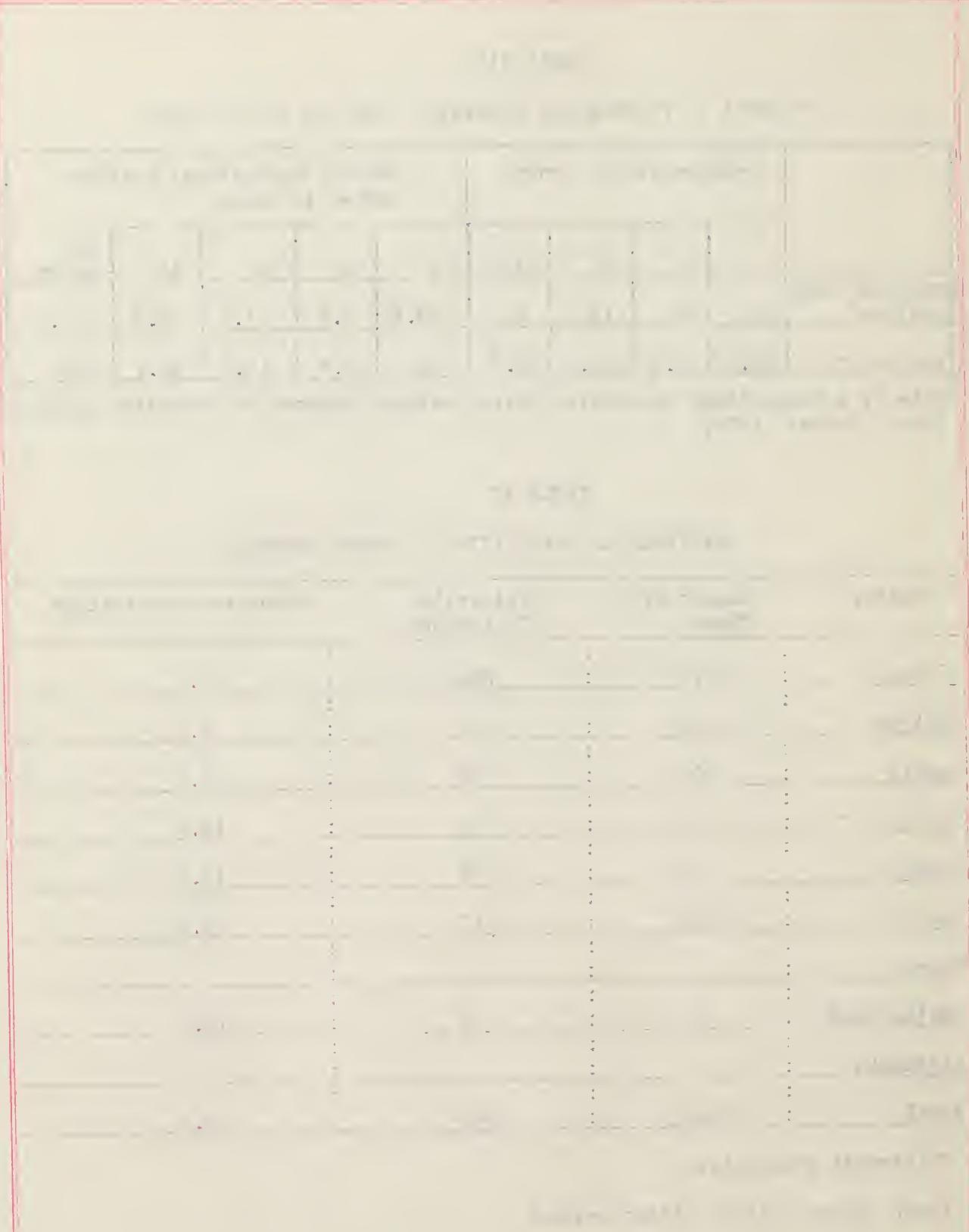


TABLE V
AGGLUTINOGENS M AND N IN PARENTS AND CHILDREN

Types of Parents	Types of children Possible	Types of Children Not Possible
1. MN X MN	M, N, MN	
2. MN X N	N, MN	M
3. MN X M	M, MN	N
4. M X N	MN	M, N
5. N X N	N	M, MN
6. M X M	M	N, MN

From: Wiener, A. S. Scientific Monthly. 40: 323-31. 1935.

TABLE VI
HEREDITY OF THE AGGLUTINOGENS M AND N

Marriages	Progeny to be Expected		
	M+ M+	M+ N-	M- N+
M+ N+ X M+ N+	50	25	25
M+ N+ X M- N+	50	0	50
M+ N+ X M+ N-	50	50	0
M+ N- X M- N+	100	0	0
M+ N- X M+ N-	0	100	0
M- N+ X M- N+	0	0	100

From: Landsteiner, Karl. Science. N.S. 73. 407. , 1931.

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TABLE VII

CHANCES OF PROVING NON PATERNITY WITH AGGLUTINOGENS M AND N

Racial Type	Frequencies of Types:			Percent Exclusions: Putative Father in Type				Un- known
	M	N	MN	M	N	MN		
	29.2	21.2	49.6	34.6	40.6	0		
European	25	25	50	37.5	37.5	0		18.75

*This is a theoretical population giving the maximum chances of proving non-paternity.

From: Wiener (1935).

TABLE VIII

CHANCES OF PROVING NON-PATERNITY WITH THE AGGLUTINOGENS

A, B, M and N.

Group	O			A			B			AB			UN-
Type	M	N	MN	M	N	MN	M		MN	M	N	MN	KNOWN
Chances (percent)	50.0	54.6	23.5	39.6	45.1	7.7	44.1	49.3	14.6	60.7	64.3	39.9	31.9

FROM: WIENER (1935).

TABLE IX
PHENOTYPES AND GENOTYPES OF SUB-GROUPS

Phenotype	Genotype	
	Homozygous	Heterozygous
O	RR	—
A ₁	A ₁ A ₁	A ₁ R and A ₁ A ₂
A ₂	A ₂ A ₂	A ₂ R
B	BB	BR
A ₁ B	—	A ₁ B
A ₂ B	—	A ₂ B

From: Wiener (1935)

TABLE X
BERNSTEIN'S THEORY

Phenotype	Genotype	
	Homozygous	Heterozygous
AB	—	AB
A	AA	AR
B	BB	BR
O	RR	—

From: Wiener (1935)

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TABLE XI
COMPARISON OF THE TWO THEORIES OF HEREDITY OF THE BLOOD GROUPS

Groups of Parents	Groups of Children (v. Dungern and Hirschfeld)	Groups of Children (Bernstein)
1. O X O	O	O
2. O X A	O, A	O, A
3. O X B	O, B	O, B
4. A X A	O, A	O, A
5. A X B	O, A, B, AB	O, A, B, AB
6. B X B	O, B	O, B
7. O X AB	O, A, B, AB	A, B
8. A X AB	O, A, B, AB	A, B, AB
9. B X AB	O, A, B, AB	A, B, AB
10. AB X AB	O, A, B, AB	A, B, AB

From: Wiener (1935)

TABLE XII
BERNSTEIN'S THEORY

Phenotype	Genotype	
	Homozygous	Heterozygous
AB		AB
A	AA	AR
B	BB	BR
AB	RR	

From: Wiener (1935)

FIGURE A
EHRLICH SYMBOLS



Blood Cells Lacking Agglutinogens



Blood Cells Possessing Agglutinogen H_1



Immune Agglutinin h_1



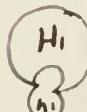
Blood Cells Possessing Agglutinogen H_2



Blood Cells Containing Both H_1 and H_2



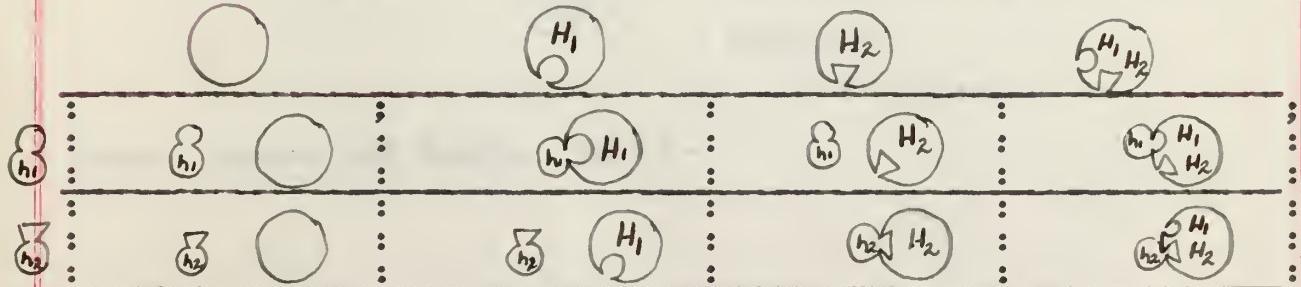
Immune Agglutinin h_2



Indicates agglutination or neutralization reaction between H_1 agglutinogen in blood cells and h_1 agglutinin in a serum.

From: Keeler and Castle (1934)

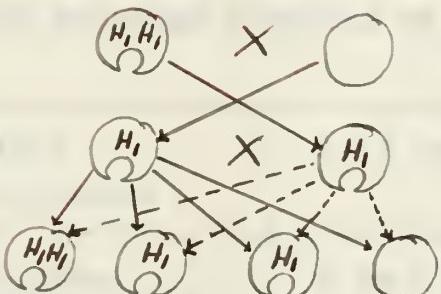
FIGURE B



From: Keeler and Castle (1934)

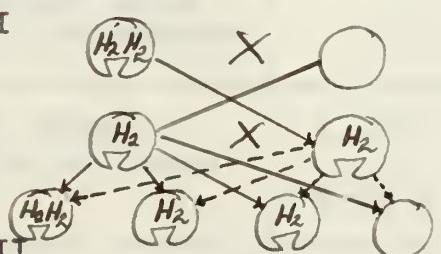
FIGURE C

CROSS I



This cross proves definitely that H_1 is a dominant Unit Character. Ratio of 1:2:1.

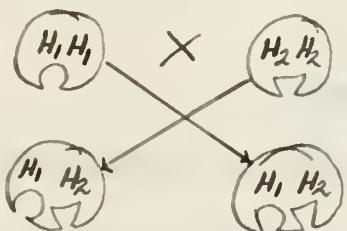
CROSS II



Proves H_2 is a dominant Unit Character. Ratio of 1:2:1.

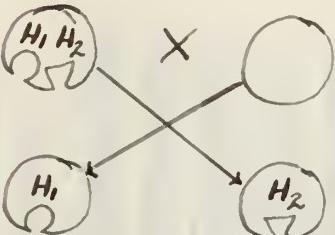
CROSS III

CROSS III



Crossing two homozygous animals of H_1 and H_2 gives only a heterozygous animal. Proves H_1 and H_2 are autonomous.

CROSS IV



Indicates that such H_1H_2 individuals transmit H_1 and H_2 in separate gametes. Therefore, H_1 and H_2 are allelomorphics.

From: Keeler and Castle (1934)

available among some 100
and thousands of other pl-

anisms in the same area.

It is also true that although
there were offshoots of plant
life, these were concentrated in
the streams and all but a

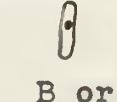
few were quite immature.
In fact, it was found that 47 per
cent of all living organisms in
the soil were off-shoots of



Fig. 1. A typical root system of a plant

FIGURE D

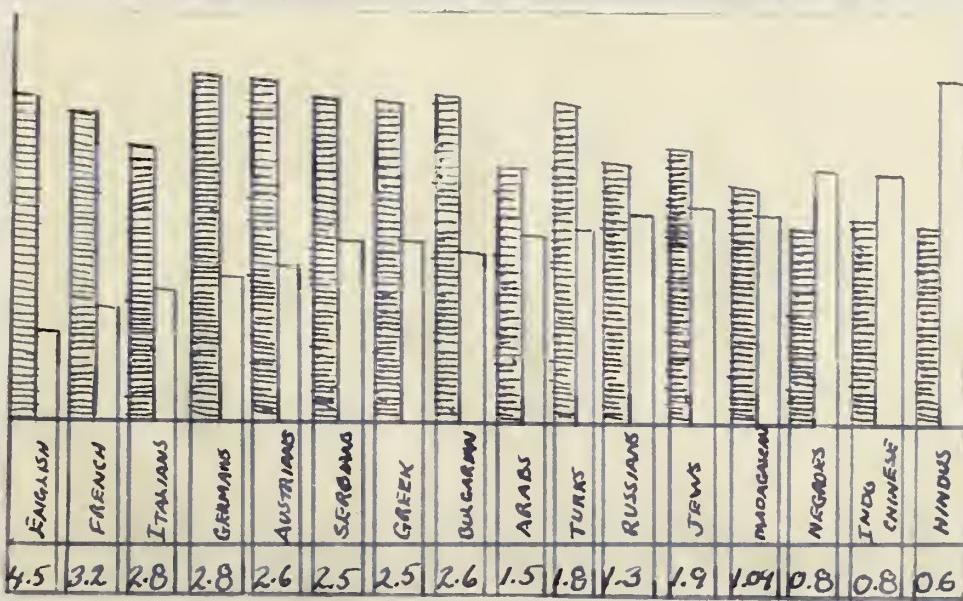
THREE PROPOSED THEORIES ON HEREDITY OF BLOOD GROUPS

:Triple Allelomorphs	: A, B or R		: A, B, or R
:Two Independent Pairs of Allelomorphs	: A or a		: A or a
:Two Linked Pairs of Genes	: A or a		: B or b

From: Wiener (1935)

FIGURE E

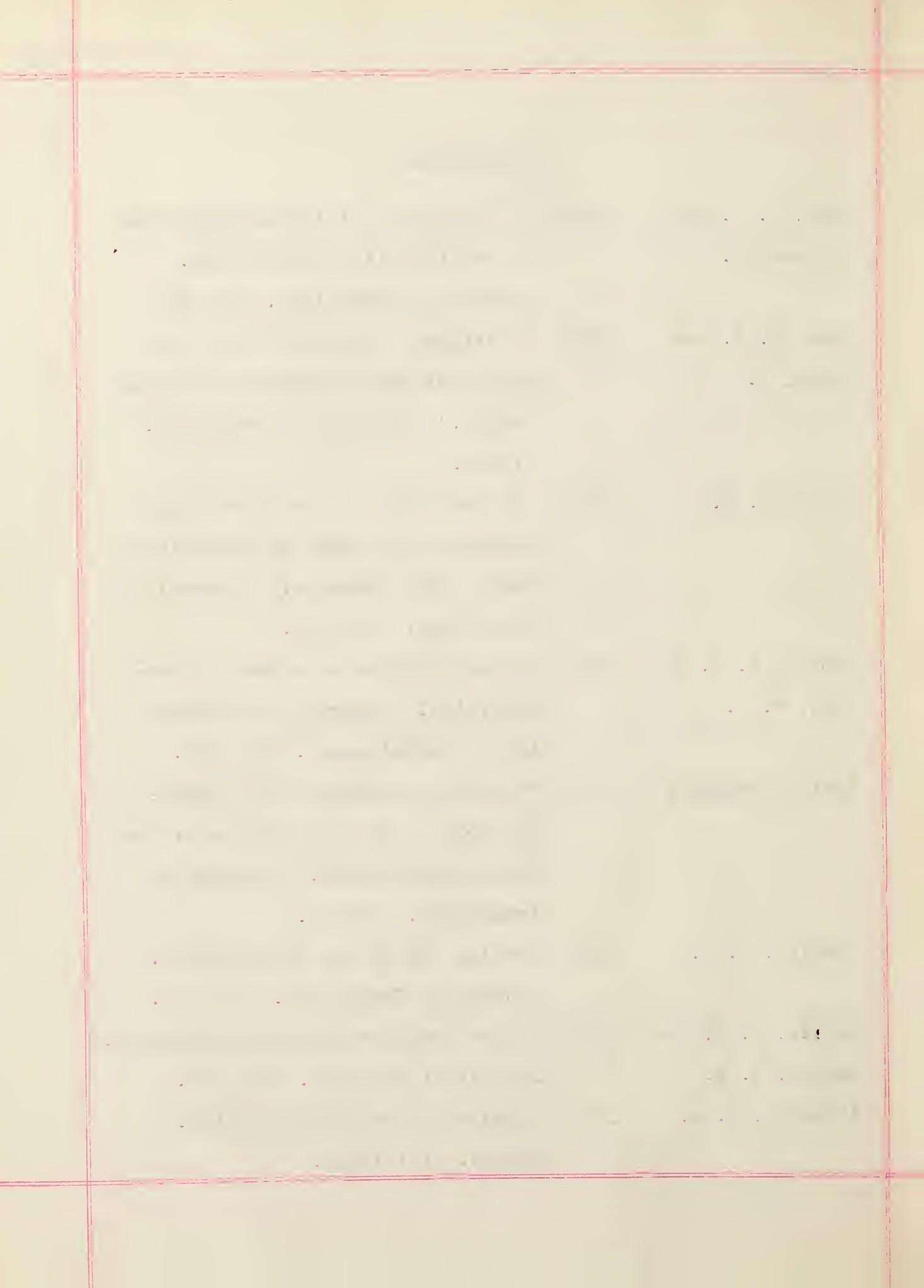
DISTRIBUTION OF THE AGGLUTININogen A AND B



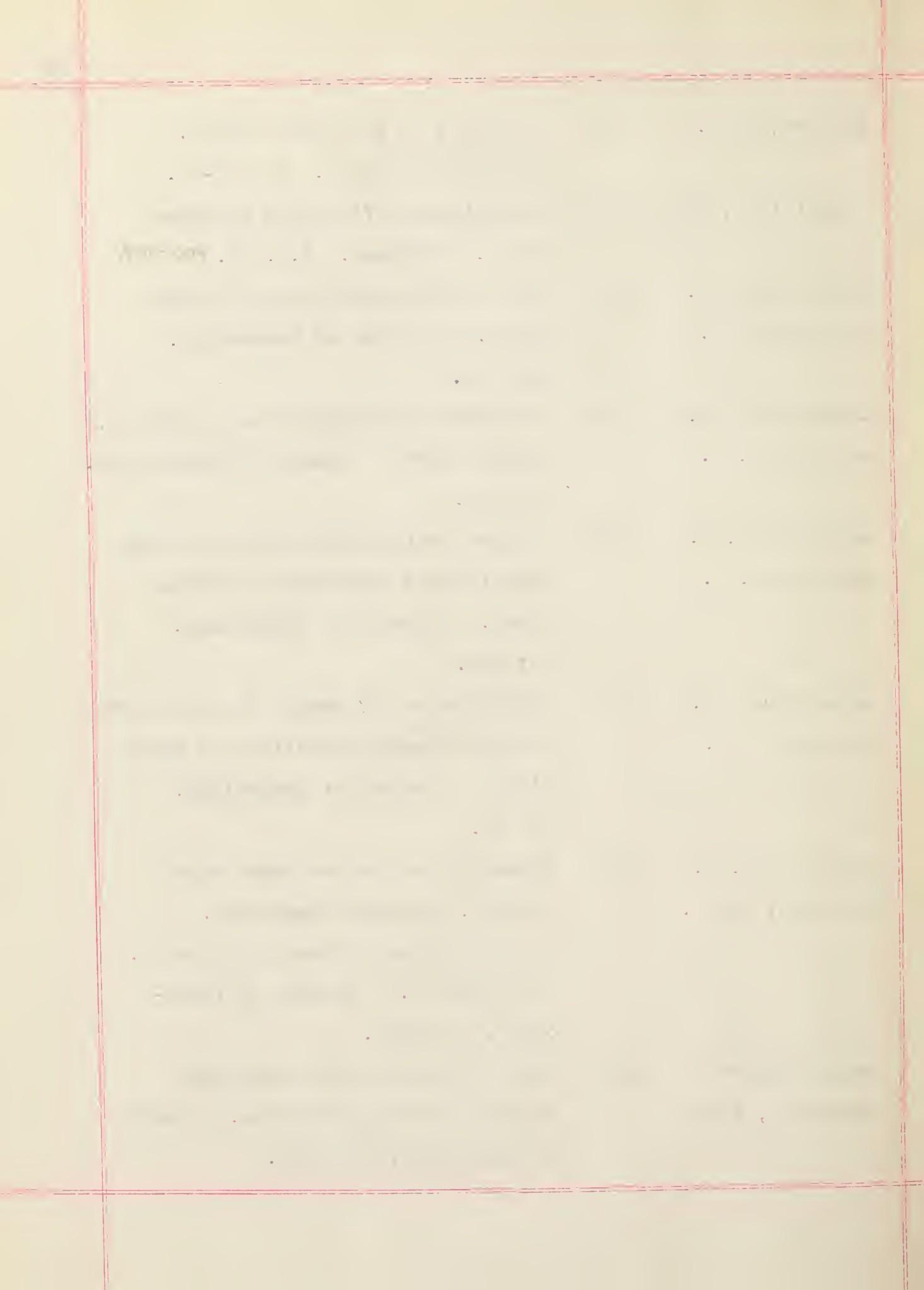
From: Wiener (1935)

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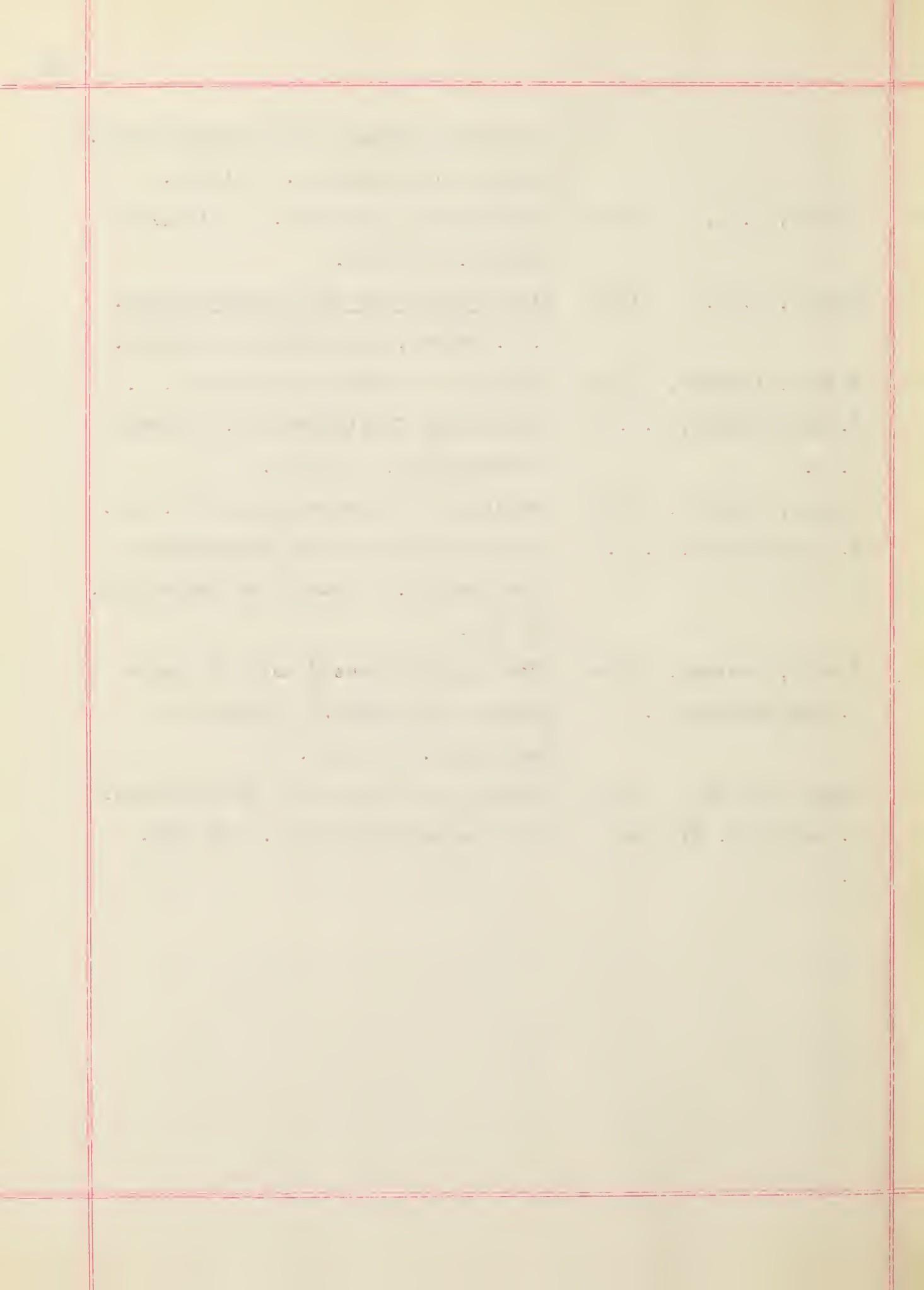


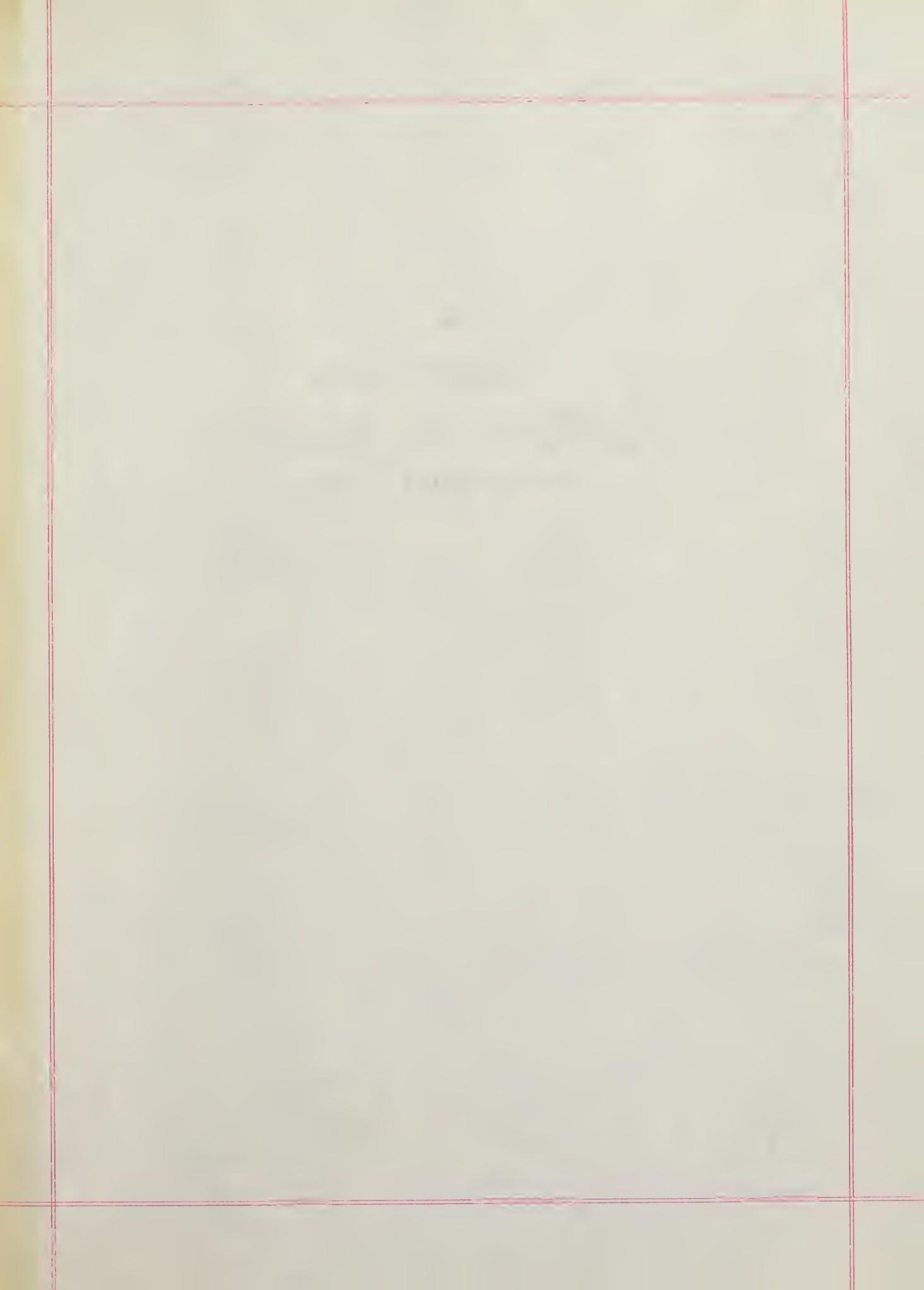
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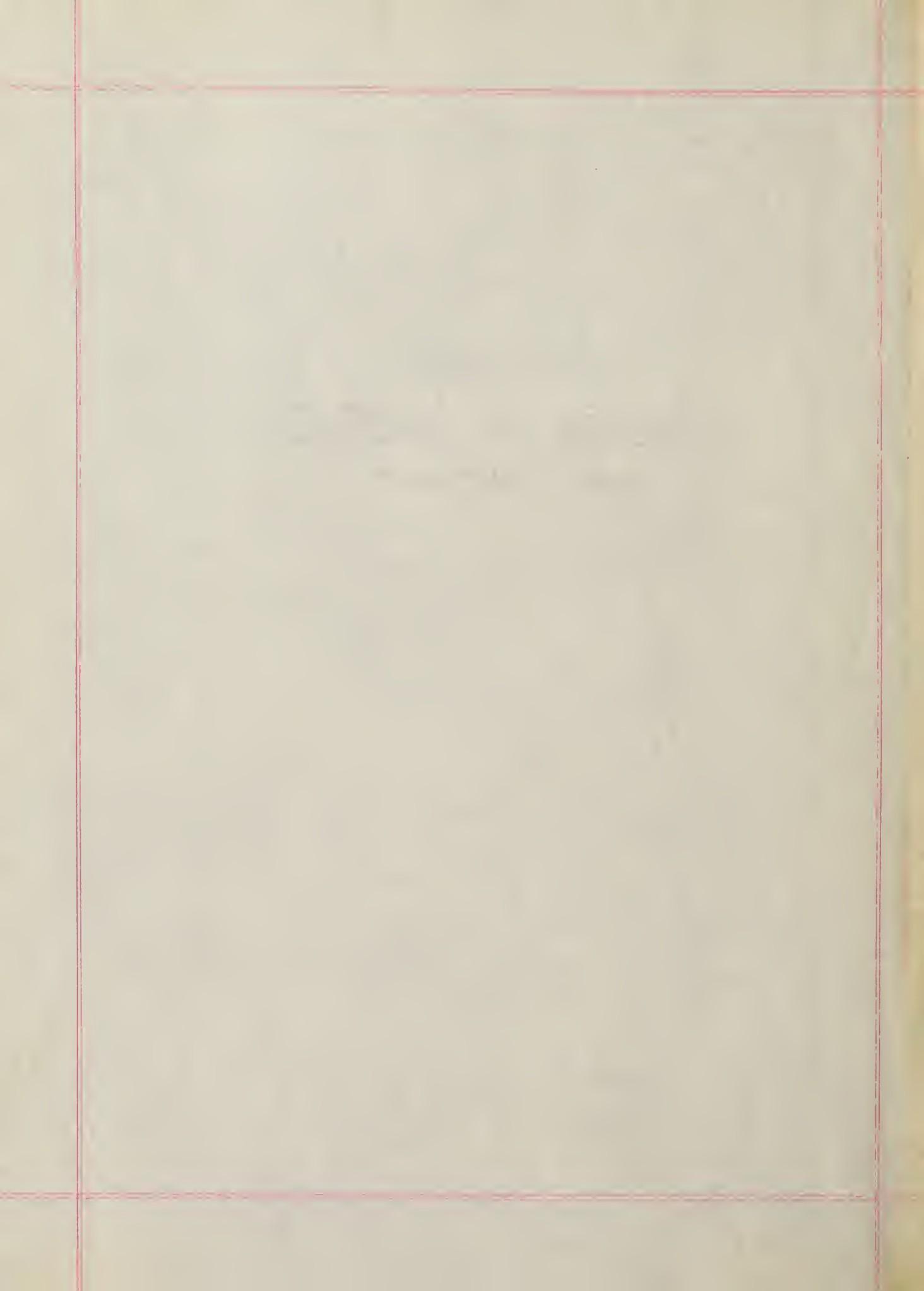


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